EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief
IRWIN H. SUCH
Editor
WM. M. ROONEY

WM. M. ROONEY
News and Markets Editor
D. B. WILKIN
Engineering Editor
J. D. KNOX
Steel Plant Editor
GUY HUBBARD
Machine Tool Editor
DON S. CADOT
Art Editor
ALLEN G. GRAY
Consulting Editor

ASSOCIATE EDITORS

J. CAMPBELL F. R. BRIGGS
AV DEEULIS VANCE BELL
TER F. TOERGE JOHN PARINA JR.

ASSISTANT EDITORS

C. Tuttle Dolores K. Blaha NRY J. Holtz L. J. Skuderin S. Morgan M. T. Borgerhoff

RESIDENT EDITORS

E. C. KREUTZBERG
Washington Editor
T. N. SANDIFER
Associate Editor, Washington
B. K. PRICE
Eastern Editor, New York
L. E. BROWNE
Associate Editor, New York
E. F. ROSS

E. F. Ross
Chicago Editor
J. C. SULLIVAN
Pittsburgh Editor
A. H. ALLEN
Detroit Editor
VINCENT DELPORT
European Editor, London

EDITORIAL CORRESPONDENTS

R. W. KINCEY, Birmingham
L. C. FELDMANN, Buffalo
SAMUEL S. CARR, Cincinnati
MAC HUTCHENS, St. Louis
GEORGE R. REISS, Youngstown
MAURICE BEAM, Los Angeles
ROBERT BOTTORFF, San Francisco
R. C. HILL, Seattle
C. K. CATES, Dallas
F. S. TOBIN, Toronto
J. A. HORTON, Birmingham, Eng.
LEON JAUDOIN, Paris, France

MAIN OFFICE

Penton Building, Cleveland 13, Ohio

BRANCH OFFICES

 fork 17
 16 East 43rd St.

 10 11
 520 North Michigan Ave.

 negh 19
 2800 Koppers Bldg.

 t 2
 6560 Cass Ave.

 ngion 4
 956 National Press Bldg.

 ngeles 4
 130 N. New Hampshire Ave.

 n
 2 Caxton St., Westminster, S.W. 1

Business Staff on Page 4

XT WEEK ...

Determination of Grinding Costs

Flame Cutting with City Gas, Oxygen
Selection of Coatings for Aluminum
The Case for Axonometric Drawing
30-Inch Pipe Line

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 11

MARCH 17, 1947

NEWS-

★ As the Editor Views the News	61
Record Year Probable if Strikes Are Avoided	65
439-Day Strike Ends at J. I. Case; Union Denied Security Provisions	67
* Present, Past and Pending	67
Steel Scrap Market Is Now Boiling	68
International Harvester Cuts Prices by \$20 Million	69
Trend Toward Return of Buyers' Market Noted by Tool Makers	69
Gray Market Steel Stocks Present Enigma	70
Departure from Prewar Pattern of Steel Distribution Claimed	71
Arguments Against Freight Rate Cut from Geneva to Coast Heard	72
Cement Basing Point Case To Be Reviewed	78
* Windows of Washington	74
British Plants Reopen as Fuel Supply Improves	77
Largest South African Steel Producer Plans \$60 Million Expansion	77
Cleveland Area Absorbs War-Born Plants; Builds Others	78
★ Mirrors of Motordom	81
Lone Star Steel May Get Plant for \$7,500,000	84
★ Briefs	85
★ The Business Trend	86
* Men of Industry	88
★ Obituaries	98
★ Construction and Enterprise	162

TECHNICAL

Photographic Studies Contribute to Better Machining Methods	94
Selection and Application of Mechanical Finishes for Aluminum	98
Uniform Welding Results Obtained by Equalizing Current and Pressure	101
Storing Engineering Materials	103
Bright Copper Plating	108
★ Engineering News at a Glance	110
* Progress in Steelmaking-Blast Furnace Thermal Requirements-Part III	120
★ New Products and Equipment	
★ Helpful Literature	139

MARKETS-

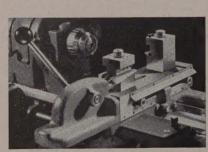
	Scrap Sizzles as Buy	ers Press Demands	on	Market		3. ,	 	141
*	Market Prices and C	omposites			 		 	142
	Nonferrous Metal P	rices Hold Firm .		i	 		 	146

* Denotes regular features.

For Exacting

CLOSE-TOLERANCE MACHINE WORK

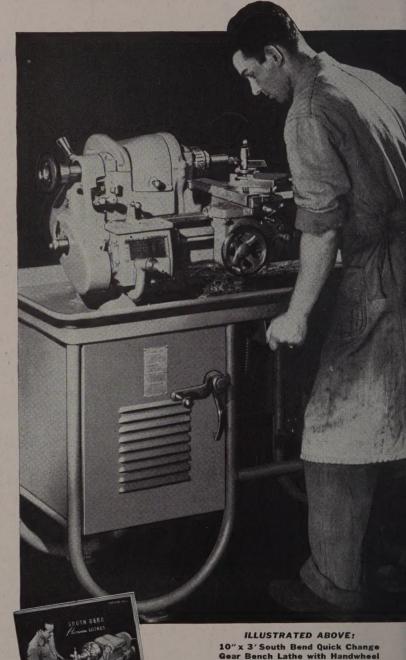
There is no substitute for precision accuracy either in the toolrooms or production plants of present-day industries. The smooth production of precision parts, trouble-free assembly, product quality and prestige, costs, and plant profits depend to a great extent on this one factor. That's why South Bend Precision Lathes, long famed for split-thousandth accuracy, are so widely used in the toolrooms, production shops, engineering and research laboratories, and in the maintenance departments of the nation's leading industries. If you are planning to install new lathe equipment, it will pay you to investigate the many advantages which versatile South Bend Lathes have to offer.



DOUBLE TOOL CROSS SLIDE

This Double Tool Cross Slide is only one item in the complete line of South Bend attachments and accessories which will help to broaden the scope of your lathes. Write for attachment Catalog 77.

VRITE FOR CATALOG



BUILDERS



Collet Attachment. This model made with bed lengths to 41/2'. Toolroom models made with beds to 4'.

AS THE EDITOR VIEWS THE

March 17, 1947

Correction Overdue

In this tense period it behooves those who deal with the printed word to strive for understanding and co-operation rather than to fan the flames of dissension. With this obligation in mind, we feel duty-bound to warn that certain practices now prevalent in the sales and distribution of pig iron, scrap and finished steel have assumed proportions that no longer can be ignored by responsible leaders of the iron and steel industry. To put the matter bluntly, there are transactions which smell to high heaven. If allowed to continue unchallenged, they will subject the industry to justifiable adverse criticism.

One is shocked by some of the things which tried and true executives of steel companies now seem to be condoning with outward equanimity. Men who for years have pursued sane policies in connection with the procurement of scrap today seem to be in the grip of a hysteria that is difficult to reconcile with the resolute attitudes they have displayed in solving tougher problems in the past.

For instance, large shipments of scrap are being cross-hauled distances of a thousand miles or more. This is unnecessary and wasteful. If steelmakers would apply today the common sense they employed in the past large tonnages of this crosshauled material could be exchanged, open-top cars could be released and one of the factors contributing to inflated prices could be removed.

Another problem calling for investigation is the offering of steel at outrageous prices by brokers who have never been identified with the steel industry. The prestige and good name of legitimate sellers is being threatened sufficiently by these fly-by-night operations to warrant drastic corrective measures at the earliest possible moment.

Another problem calling for attention is the belief, held in some quarters, that steelmakers are discriminating against foundries. It is charged that blast furnace capacity is being allocated to steelmaking iron at the expense of foundry grades. If the charge is true, the allocation should be corrected; if it is false, an explanation would clear the air of insinuation.

None of the three problems cited is simple nor are steelmakers wholly responsible for their solution. However, steel executives are in a position to wield a more powerful corrective influence than any other group. Constructive leadership initiated by any half dozen of a score or more of highly respected steel company executives could free the industry of much current criticism within a fortnight.

OFF ON A NEW TACK: In presenting to a joint session of Congress a request for \$400 million for aid to Greece and Turkey and for authority to detail military and civilian personnel to supervise this expenditure, President Truman last Wednesday took a formal step which is certain to focus long overdue attention upon the role this nation is to play in world affairs in the future. The Greece-Turkey situation, coupled with the Moscow conference and the forthcoming world trade conference at Geneva, should go a long way toward causing every American to realize that the United States now is confronted with international problems which cannot help but exercise a profound influence upon internal affairs.

Congressional debate of the Truman proposal probably will bring to light widely divergent opinion, from extreme isolationism to equally extreme internationalism. In the end, the decision probably will be one that commits the nation to far greater responsibilities for preserving free institutions abroad than most Americans have anticipated.

This decision, which seems inevitable, will mean much to American business. It will mean that al-

most every domestic policy affecting business no longer con be formulated on the basis of internal considerations alone. Most of the rules by which we live and work will be affected importantly by the requirements of our commitments abroad.

We are embarking upon a voyage into uncharted, difficult waters. —pp. 74, 76, 141

CLEAR-CUT MANDATE: Experience with the Wagner and other New Deal labor acts would seem to be adequate reason for correcting them, but if more convincing evidence for reform is required it now is at hand in the Supreme Court decisions in the Lewis and Packard foremen cases.

The unusual number of opinions handed down in the unique coal situation and the 5 to 4 split on the foreman's union prove conclusively that even the highly-trained minds of this august tribunal cannot agree on the meaning of existing labor legislation. If this array of expert talent is confused by the provisions of these laws, is it any wonder that the officials charged with the responsibility of administering them at times are guilty of straying far afield from the intent of those who wrote the laws?

Such studied disagreement among the justices should be a clear-cut mandate to Congress to rewrite the labor laws in language that can be understood.

—p. 65

LONG ARM OF FINANCE: An interesting angle has developed in the controversy over rail freight rates on iron and steel products from Geneva, Utah, to key consuming points on the Pacific coast.

The Kaiser Co., in company with a number of independent steel producers, is protesting against a proposed 31 per cent reduction in rates on shipments from Geneva. Reconstruction Finance Corp., while not formally aligned with the Kaiser interests in the protest, nevertheless has expressed interest in the case in two letters to the Interstate Commerce Commission.

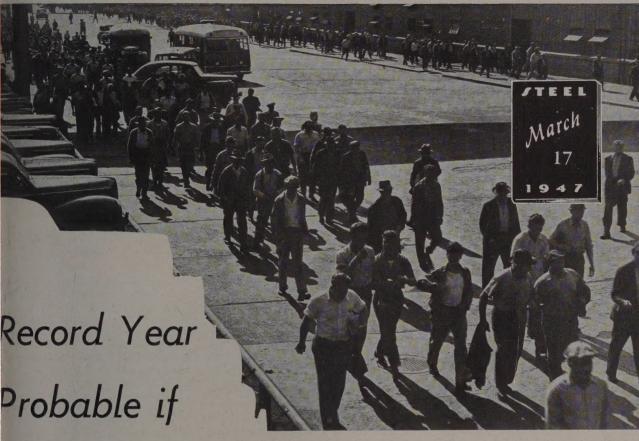
This interest stems from the fact that in order to pay the annual installments on a loan from RFC to Kaiser, the Kaiser Fontana plant should be setting aside \$10 of the revenue of every ton of steel produced. Obviously RFC is concerned as to whether the proposed freight rates will impair Fontana's ability to pay.

The incident is a reminder of the far-reaching complications that sometimes arise from wartime government financing.

—p. 72

SIGNS OF THE TIMES: which Secretary of State George C. Marshall will discuss with representatives of the USSR at Moscow is the peculiar situation wherein Russia seems to have obtained copies of "practically every industrial, chemical and military patent from our patent office" (p. 76) whereas since 1927 Russia has refused to give us a single copy of her patents. Pointed questions concerning this one-way "exchange" of knowhow are being raised by the House Committee on Un-American Affairs. . . Bonded brake drums, in which linings are bonded to the drums by a process which obviates the use of rivets (p. 81), are gaining favor in the automobile industry and may be adopted as standard equipment by some manufacturers when fixtures, furnaces and accessories necessary for their mass production are available. . . . Industrial expansion in the Cleveland area has pushed employment to a peacetime high (p. 78) and production in 1947 and 1948 may exceed wartime volume. Only three government-owned plants in the area remain idle. . . . According to Richard H. De Mott, vice president, SKF Industries Inc. (p. 82), the most widely used machine in the United States is the pump. He estimates that at the end of 1946 there were more than 100 million pumps in use, compared with 34 million automobiles, 20 million refrigerators and 28 million telephones. . . . It is expected that details of the purchase of the 1200-ton blast furnace and coke ovens at Daingerfield, Tex., and coal mines at McAlester, Okla., from WAA by the Lone Star Steel Co. for \$7,500,000 (p. 84) will be completed by Mar. 24. ... Electric power consumption for the first ten weeks of 1947 (p. 86) was 19 per cent above consumption during the corresponding period of 1946. ... In the course of research conducted by Cincinnati Milling Machine Co. over the past 20 years (p. 94) many theories concerning the mechanism of the metal cutting process were proved or discarded on the basis of photographic evidence. In some instances, photographic records yield information that cannot be obtained in any other manner. . . . Charles M. Parker of the American Iron & Steel Institute states that the American steel industry handles more materials per ton of finished product (p. 110) than any other large-scale manufacturing industry in the world. For every ton of finished steel, 68 tons of raw materials, steel-in-process, by-products and waste products are handled.

E.L. Shaner



Strikes Are Avoided

First quarter production volume setting peacetime highs, despite materials shortages. Major wage contracts due for renewal in second quarter. Settlements may determine whether 1947 will be boom or only fair year

FIRST quarter production volume is emonstrating what American industry in deliver to consumers—given reasonble freedom from strikes.

Despite materials shortages, which attinue a serious limiting factor, the dume of the metalworking industry for a first three months will establish new cords in many lines, closely approach cords in others.

Barring serious work stoppages, there little doubt that 1947 industrial outit of civilian products will reach new ths.

Steel production, for example, for the st three months will approximate 21 illion tons of ingots. First quarter out-tin 1946 amounted to only 11,771,-8 tons. This period in 1946, of course, vered the nationwide steel strike when actically all mills were down for five

Automobile and truck assemblies for the first quarter will be between 1,190,000 and 1,200,000 units, compared with 346,479 units in 1946. Current assemblies are at an annual rate of more than 5 million. The poor showing in 1946 was attributable in large measure to the General Motors strike and other work stoppages, as well as to materials scarcities and the difficulties incident to reconversion.

Coal production so far this year is running 3 per cent ahead of 1946. In many weeks, mine output of bituminous has exceeded 13 million tons.

Electric power distribution has been running about 20 per cent ahead of 1946. Comparisons for these basic indicators for the first two and a half months of 1946 and 1947 are contained in the charts on page 66.

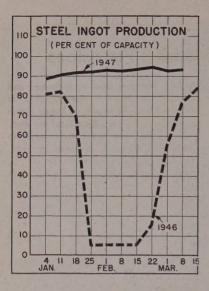
The Federal Reserve Board's index of

More than 55½ million persons are gainfully at work in the United States and payrolls are touching peacetime peaks. Unemployment is only 2½ million

industrial production is 188 per cent of the 1935-39 average and is well above any other peacetime period.

On the basis of the start made to date, and considering the demand, capacity and working force, the way appears clear for a boom year, provided major labor disturbances can be avoided. Scarcities of materials, particularly steel, pig iron, copper, lead, iron and steel scrap, and of some components, will continue to impose ceilings on production in many industries but these ceilings will not be so low as to preclude a whopping big output.

Prospects for continued labor peace are obscure. Major unions have contracts coming up for renewal within the next few weeks or at least by mid-year. Foremost among these are the basic and nonbasic steel industries, the automotive industry, and the soft coal industry. Generally union leaders are walking and talking softly, pending determination of the nature of the new labor legislation to be enacted by the 80th Congress. There are some indications that new agreements may be reached without serious work stoppages. But management, with 1946

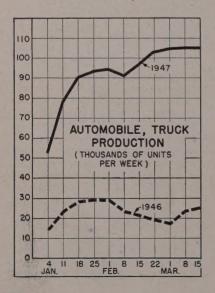


experience still fresh in memory, is set to expect most anything.

The recent Supreme Court decision against John L. Lewis and the United Mine Workers is interpreted as having extended the coal truce by three months, to July 1 when the mines are to be returned to the owners. Whether the miners and operators will agree to a new contract by that time is questionable.

Secretary of Interior J. A. Krug last week indicated he will not call a meeting of the operators and miners until the latter comply with the court order to withdraw their strike threat. Mr. Krug is reluctant to call an industry-union meeting now for the following reasons:

- 1. Lewis cannot end his government contract before June 30 when federal seizure ends. The coal operators see no point in giving Lewis anything better than his government contract before that date. Lewis probably will accept nothing less before that time.
 - 2. Southern coal operators are opposed



to industry-wide bargaining and prefer to hold up on negotiations to see if Congress passes proposed legislation to ban it.

3. Since conferences now probably would result in a stalemate, Mr. Krug prefers not to be responsible for calling them. If Lewis doesn't withdraw his strike threat soon, Krug believes the operators may call a meeting.

In the steel industry, negotiations appear to be making little progress on the controversial issues. Discussions to date have been on the noneconomic issues and the union appears to be feeling its way cautiously on wages and other economic issues. Part of the reluctance by the union to discuss the economic issues has been attributed to a desire to see what happens in the coal industry and part to anxiety over the type of labor legislation to be drafted by Congress. Meanwhile negotiators have been discussing a wide variety of topics, from plant ventilation to summer recreational activities. weeks remain until the contract extension expires April 30.

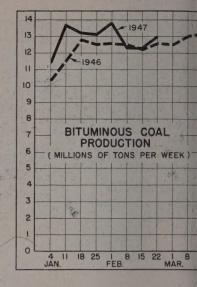
UAW Prepares Demands

The General Motors department of the United Automobile Workers-CIO is preparing to ask negotiations on contract revisions of the corporation March 19. A two-day conference of union delegates held in Detroit resulted in a series of recommended demands, highlighted by a request for a guaranteed weekly wage of 40 hours' pay whenever the workers are called in on Monday. The union also will ask for a 23½-cent hourly wage increase, employer-financed social security plan, old-age retirement program, wage equalization fund and revised vacation pay schedule.

Characterizing the guaranteed weekly wage proposal as a "first step in laying a sound basis for a guaranteed annual wage," the union points out that over the past eight or nine months GM employees in many plants have suffered from short work-weeks due to irregularity of production developing from materials shortages. Work-weeks often have been down to only 25 or 30 hours' pay and the UAW believes that since its members have to be available for full work-weeks, they should receive guaranteed 40-hour pay, even if production must be cut back.

Revised vacation pay schedules to be asked by the union will seek allowances ranging from 24 hours' pay for employees with six months to one year seniority, to 144 hours' pay for those with over eight years' seniority. Present allowances are based on a percentage of annual earnings, ranging from 2 to 4½ per cent, according to seniority.

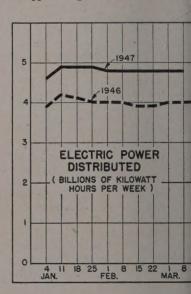
In Congress, the Senate Labor Committee concluded six weeks of hearings and went into executive session to draft



the proposed labor legislation. The Houcommittee hearings continue.

Current indications are that majori sentiment in both the House and Sena Committees will support a law containing these features: 1. Outlawing of strik unless voted by a majority of the worke involved by secret ballot; 2. outlawing of secondary boycotts; 3. outlawing mass picketing and violence on pick lines; 4. banning of jurisdictional strike 5. making the unions equally responsib with management for living up to co tracts; 6. penalizing workers who enga in wildcat strikes; 7. permitting enti freedom of speech to employers; 8. or lawing of unionization of foremen as supervisory workmen. The latter prosion becomes especially important in vie of last week's decision by the Suprer Court upholding the right of foremen unionize under the provisions of the Wa ner Act.

On many critical issues, there is y no apparent agreement. Whether or r



to outlaw the closed shop is one of these. In the first place, many employers willingly enter into closed shop contracts. Second, many congressmen believe that if the powers of the unions are drastically curbed in other directions it might be wise to allow them the security advantage.

Another undecided question is whether or not to require unions to make public announcements of the financial status.

What to do about the Norris-La Guardia Anti-injunction Act also remains a problem. A considerable group of congressmen believe the use of injunctions should be confined to the government, permitting the government to step into abor disputes on behalf of the public.

Many legislators who earlier favored rather soft revisions of the labor laws have changed their attitudes after dealing with labor leaders during the hearngs. Union spokesmen unanimously have opposed the proposed revisions.

Even Sen. Wayne Morse (Rep., Oreg.), ong considered a friend of labor, has complained time and again about labor's ack of co-operation. Other senators say his lack of co-operation is forcing Congress to "write its own ticket." Sen. Allen Ellender (Dem., La.) says the "negative attitude" of labor leaders "has peruaded many members of Congress who were on the fence to get off."

Labor leaders have aroused hostility by the worst display of public relations the capital has witnessed in many years. They shouted, accused the congressment "labor-baiting," of having "made up heir minds in advance" and of having istened to "lies" about Communist domnation of certain unions. One leading ligure, Van A. Bittner, vice president of the United Steelworkers, and head of the Ito's southern organizing drive, told the Touse committee it was not qualified to write a labor bill and suggested the United states would be better off if Congress ook a ten-year vacation.

Truman Asks Advisers To Study Wage Plan

President Truman has asked his Counil of Economic Advisers to study the economic implication" of the guaraneed annual wage plan as an aid to the tabilization of employment. He asked he council, headed by Dr. Edwin G. Nourse, to consider "existing legislation a the fields of social insurance, minimum vages, fiscal and tax policies, and other two that affect the inauguration or peration of annual wage plans."

The President's action followed subaission of a report of the Office of War fobilization & Reconversion study STEEL, Dec. 2, p. 86; Dec. 9, p. 65; Dec. 23, p. 21, 37; Dec. 30, p. 47).

439-Day Strike Ends at J. I. Case Co.; Union Fails To Win Security Provisions

SECOND longest strike in the country's industrial history, the 439-day stoppage at the J. I. Case Co., Racine, Wis., was settled Mar. 9 on terms offered by the company last year. The union failed to win any form of union security for which the strike was called.

The strike, which started Dec. 26, 1945; was noteworthy for its duration and for the absence of violence and picketing. The stoppage was called in the absence of a contract between the company and the United Automobile Workers. Previous contract, directed by the War Labor Board had expired Apr. 24, 1944, and had not been renewed. One of the points at issue was the union's claim to exclusive bargaining rights and the company's insistence upon the right of workers to bargain individually.

The deadlock that followed defied all efforts at solution for more than 14 months, during which the Case workers lost nearly \$12 million in pay checks.

Federal agencies tried to intervene and federal seizure was contemplated at various times. Secretary of Labor Lewis Schwellenbach and Secretary of Agriculture Anderson attempted vainly to arrange meetings of company management and union officials. A committee of Racine business men failed in an attempt to effect a peace. State labor officials had no better success.

The end came on a vote by the union local, 927 to 448, to accept the company's terms and end the protracted walkout.

The terms included: A 25 to 26-cent hourly pay increase; vacation pay adjustments for 1944, 1946 and 1947; revamped grievance procedure and a paid steward system; a company pledge not to discriminate against employees because of union membership.

The union fought successively for a closed shop, a union shop, maintenance of membership or dues checkoff, but won none of them.

Present, Past and Pending

■ INLAND, CARNEGIE-ILLINOIS EXCHANGE LICENSES
CHICAGO—Inland Steel Co. and Carnegie-Illinois Steel Corp. have exchanged

Chicago—Inland Steel Co. and Carnegie-Illinois Steel Corp. have exchanged licenses for the manufacture of their corrosion-resistant, high-strength, low-alloy steels, Hi-Steel and Cor-Ten, respectively.

■ TAYLORCRAFT BIDS TOTALING \$893,000 APPROVED
CLEVELAND—Bids totaling \$893,000 for real estate and materials of the

Taylorcraft Aviation Corp. at Alliance, O., have been approved by Carl D. Friebolin, referee in bankruptcy. Largest single bid was by Armour & Co., Chicago, of \$535,000 for buildings and land.

MACHINE TOOL ELECTRIFICATION FORUM SET

Pritisburch—Westinghouse Electric Corp.'s annual machine tool electrification forum will be held Apr. 22 and 23 at Hotel Statler, Buffalo, featuring discussions of electrical problems relative to design and function of machine tools.

■ 30,000 TONS FOREIGN COPPER ALLOCATED

WASHINTON—American copper consuming industries will receive 30,000 to 35,000 tons of foreign metal from dwindling government stockpiles during March, This will reduce stockpiles to 20,000 to 25,000 tons.

■ SURPLUS MAGNESIUM FOUNDRY ON BLOCK

CHICAGO—War Assets Administration will receive bids to Apr. 15 for purchase or lease of the government-owned magnesium foundry at 4918 W. Bloomingdale Ave., operated during the war by Howard Foundry Co. Plant cost the government \$2,585,000 and is equipped to produce 350,000 lb of large magnesium sand castings a month.

■ ARMCO ESTABLISHES PEACETIME RECORDS

MIDDLETOWN, O.—New peacetime records for sales, earnings and net tons of finished steel produced were set by American Rolling Mill Co. in 1946. Net earnings totaled \$18,552,491, compared with \$13,392,196 in 1945.

Steel Scrap Market Is Now Boiling

Hint of tapering in spiral seen in some buyer resistance but definite sign of turn lacking with new demand pressures felt

PRICE SPIRAL in iron and steel scrap continues though last week a few signs appeared hinting of a possible tapering of activity, consumer resistance to the high prices being noted here and there. Also, one large Pittsburgh steelmaker was reported to have cancelled one contract, the flow of material into his yard being substantial. However, there was no definite sign that a turn in the market had come, new factors exerting increased demand pressure on the price structure.

Veteran scrap men, aghast at the rapidity of the market's climb and frankly fearful of a terrific crackup when the reaction gets under way, for weeks have been predicting a leveling off in prices with the coming of spring weather and the traditional pickup in shipments. This thinking, of course, was largely based on past experience. Last week this view persisted though no one would predict when the turn actually would come.

Pittsburgh Market Fluctuates

Currently the market for steelmaking scrap is quoted at Pittsburgh from \$38 for locally collected material all the way up to \$46 for material brought into the area from remote points. With the exception of a few instances during World War I, when isolated sales above \$50 were reported, the market at Pittsburgh is on the highest level yet recorded.

Since last November, when price control was removed, scrap has spiralled at the fastest pace in history, in a period of four months the price on heavy melting steel at Pittsburgh about doubling. Previous most rapid advance was experienced in the period 1916-1917, when prices rose from \$17.50 at the beginning of 1916 to a top of \$40.25 in July, 1917, a period of 19 months.

Conditions today are not comparable with those immediately following World War I. For one thing, price control was lifted almost immediately upon termination of the first world war. That was not



Part of the 135,000 steel helmets which recently were charged into the open hearths at Bethlehem Pacific's South San Fransico plant. Some had never been used; others showed scars of battles and many still retained their camoflage coverings

the case after the second world war, price control continuing in effect for about 15 months following the Japanese collapse. Consequently, it is not surprising that the course of the market since the late war has not paralleled that after World War I.

Immediately following World War I, scrap prices tended downward, falling from \$29 on heavy melting steel in November, 1918, to \$14.60 in March, 1919 and then slowly rising until by the end of the year the market stood at \$24.65. Prices continued upward in 1920, hitting \$28.60 in September when a reaction set in preceding the recession of 1921-22.

When World War II ended in August, 1945, heavy melting steel was quoted at \$20, Pittsburgh. Due to price control that level held until well into November, 1946, when government controls were removed. In that latter month the price averaged \$23 and in December it rose to \$28.50, continuing upward steadily in the first three months of this year with the January average \$32.50, February \$33.75 and March to date, \$36.

Various factors contributing to the present surge in the market were absent prior to the war. For one thing, the earmarking of consumers' scrap for certain mills in return for new steel is a relatively new development, at least on the scale now prevailing. This has increased the number of factors competing for scrap and has reduced tonnage available in the open market. Then, also, the fact that the mills are giving brokers what amount to open contracts lends to the free bidding

up of prices as brokers scramble for to nage all over the map in an attempt cover commitments to mills. Placing firm contracts with the brokers by t mills would discourage the raiding local markets by distant mills, whi practice has led to the upping of loc mill bids for material in their hor areas as a protective measure again outside incursions.

Still another factor peculiar to the current situation is the fact that consumption of scrap today is much largthan it was immediately after World W. I. Also, supplies were more plentiful than today, heavy collections duri World War II denuding many supproduces to an unprecedented extent, of which lends to a tight supply sitt tion with steelmaking operations being pushed at the highest level in peacetinhistory.

The January and February rate consumption of purchased or open-maet iron and steel scrap, which was slight in excess of 2 million gross tons month, appears to be extending in March, according to E. C. Barring executive secretary, Institute of Scriron & Steel, Inc. This is within 5 pent of the all-time record melt of 2,14 000 tons in March 1945 and again May of the same year.

"After the greatest mechanized war history the supply of purchased sor is understandably restricted," said B ringer. "Millions of tons of potent scrap were shot away in battle, sunk, d posed of overseas as surplus equipme or locked up in government warehouses. Wartime salvage drives anticipated obsolescence and dried up some sources,

"Notwithstanding all this, enough scrap is moving to consumers to support an operating rate of over 94 per cent at steel mills and almost as high a rate at iron foundries. None is going into inventory, but neither consumers nor dealers normally accumulate stocks in a high market.

"It is maldistribution and excessive, uneconomic competition for the available supply rather than an actual shortage that is putting a strain on the market."

Hopes are widespread that with the coming of spring a larger flow of scrap into consumption will be effected. Heavy manufacturing operations are seen as providing a steadily rising volume of production scrap while country and general collections are confidently believed likely to increase. This heavier flow, it is said, should serve to provide a brake on the current price spiral.

At the same time government agencies indicate they are taking steps to make considerable scrap available from surplus stockpiles. Last week, John R. Steelman, assistant to the President, said that since last July the various government agencies have been participating in an emergency program to increase the flow of government-owned scrap to the steel mills. Under this program more than 1,000,000 tons of iron and steel scrap were made available from July through February and 30 ship scrapping operators leased government-owned facilities or acquired private shipyard facilities to scrap surplus ships. Scrap from these vards is now being produced at a rate of 50,000 long tons per month, Steelman said it is imperative, however, that more be done and that he has conferred with the heads

(Please turn to Page 159)

Trend Toward Return of Buyers' Market Noted by Tool Builders

Interest in new standard machine tools lags but newly developed lines are attracting attention and figure prominently in ordering. Surplus tools provide large replacement parts market. Shortages of components continue to restrict production

CLEVELAND

SLUMP in machine tool orders which began last April has resulted in a growing tendency toward a return to a buyers' market. Mounting costs and uncertainty over availability of materials are acting as depressing factors in the market, many prospective buyers holding off modernization and expansion programs until more normal economic conditions return.

Lively interest is being shown, however, in new lines of machinery as they are introduced to the trade. A Cincinnati builder, for example, who has developed a new lathe reports heavy inquiry concerning its performance and substantial ordering.

Offerings of surplus tools by the War Assets Administration continue to adversely affect new standard machinery builders, although many who had previously decried WAA's disposal policies are now turning the sale of surplus machinery to their own advantage through large-scale repair and replacement of parts which had suffered from three-shift operation over long periods without proper maintenance.

One-purpose machines, built for strictly war purposes, are being bought in quantity from WAA by machine tool manufacturers, who are tearing them down and rebuilding them into multi-purpose machines with peacetime applications.

Competition from surplus government-

owned machine tools, it is believed, has passed its peak, the best machines having been acquired by private interests. An undetermined amount of machinery has not yet been declared surplus, but it is expected that much of this equipment will be operated under lease in its original plant rather than sold outright.

Machine tool builders, endeavoring to work off their order backlogs, are faced with the same shortages which confront manufacturers generally. Shortages of electrical components, particularly, plague the builders, with copper the principal stumbling block. Large motors in some instances require as much as one year for delivery, with roller bearings, chain drives and castings also in short supply.

As a hedge against possible wage increases for labor in the machine tool industry, some builders are selling machinery with escalator clauses included in their contracts.

Blast Furnace Practice Discussed at Meeting

Wind velocity in blast furnace practice is a function of voids, and since coke accounts for 60 per cent of voids in the raw materials, any change in the character of the coke results in poor operations, it was brought out at the annual winter meeting of the Eastern States Blast Furnace and Coke Oven Association, Roosevelt Hotel, Pittsburgh, Mar. 7.

Blast furnace operation under high top pressure came in for discussion. By plotting wind velocity against the burden ratio it was found that a velocity of 50 ft per second based on 10 per cent voids can carry a higher burden and practice has disclosed that the coke rate can be decreased 12 per cent.

In operation of a Cleveland stack under high top pressure it was brought out that at times the top pressure has been 12 psi. The turbo-blowers are delivering 115,000 cfm wind at times. Normal operation under 10 psi top pressure and with 90,000 cfm wind gives no trouble, it was stated. The blast delivery of 90,000 cfm gives a normal bottom pressure of 30 psi. It was stressed that this pressure will not be efficient with beneficiated ores which will be available in the future.

International Harvester Cuts Prices by \$20 Million in Attempt To Halt Inflation

PRICE cuts aggregating \$20 million annually, announced last week by International Harvester Co., Chicago, constitute the second such action taken by a large corporation this year in an effort to stem the rising tide of inflation. International Harvester's reductions are considered on a par with those announced by Henry Ford II for the Ford Motor Co. in January cutting the prices of automobiles from \$15 to \$50 each.

Fowler McCormick, chairman of the board of International Harvester, said the action was taken because the company feels that all industry has been caught in a "vicious circle" of progressively rising prices, profits and wages. He empha-

sized that neither consumer resistance to present prices nor competitive necessity entered into the price decision.

"We believe strongly the best way to distribute the gains of rising productivity is through lowering prices. We are cutting now, although there is every promise that we can sell all we make this year and next at present prices."

Mr. McCormick said the decision to cut prices was predicated on three probabilities: 1. That present wage negotiations will be settled on reasonable terms; 2. that production will not be interrupted by strikes; 3. that the company can continue to buy its materials at present or lower prices.

March 17, 1947

Gray Market Steel Stock An Enigma

Supply-starved manufacturers ask mills how brokers are able to obtain tonnages which they are offering at fantastic prices

NO ONE knows how much steel is moving in the "gray" market, but whether the tonnage is large or small the chorus of protests coming from consuming circles is growing in volume as buyers' queries as to where this "bootleg" steel is coming from in the present tight market largely go unsatisfactorily answered.

Reports from consuming centers indicate most buyers have been approached by brokers of the fly-by-night variety with offers of substantial tonnages at prices far above recognized market levels. Investigation of some of these offers has shown the steel to be available in much smaller quantity than offered, and in some cases, nonexistent. However, many buyers, pinched for tonnage to complete work in process, have paid fantastic prices for small lots, and there is no telling what these tonnages aggregate.

Most of the buying of this over-priced steel is by small metalworking shops unable to obtain sufficient supplies in regular market channels.

Contradictory reports are heard with respect to both the volume of metal moving in this market and the prices being quoted. Recently "gray" market prices were reported down three to four cents per lb with consumer resistance to offerings in evidence. However, there is no way of definitely confirming this report, and, meanwhile, signs accumulate to indicate broker offerings are commanding increasing attention from buyers who hitherto have held aloof from this shady market.

What steel buyers would like to know is, where do the brokers get the steel. The mills deny they are supplying the "gray" market, and claim that they are doing everything possible to prevent any leak to it from their distribution. Some metal, it is said, may be getting into the hands of brokers through conversion deals in which holders of scrap pay a conversion charge to a mill to melt scrap into ingot. This ingot in turn is shipped to another mill for rolling into sheets on



AIRBORNE TUBING: An Egypt-bound transport plane recently took off from Pittsburgh carrying a 14,326 lb cargo of steel pipe to repair a Suez petroleum cracking still, which could not operate until the pipe arrived 50 hours after leaving the plant of Pittsburgh Steel Co. Photo shows cargo being braced to prevent shifting

a conversion basis, and the sheets in turn are disposed of by the owners in the "grav" market.

Then again, some of the metal floating around possibly has been diverted from a priority project, or from metal stocks originally earmarked for export. For example, a manufacturer of water heaters said he recently purchased sheets in the "gray" market and they were of top quality and apparently in unlimited supply, a mystery to him considering the tight state of the sheet market. Part of the mystery as to the source of this broker steel, however, was cleared up in his mind when a tonnage of "gray" market sheets came to him bearing the name of his usual mill source. Checking with this mill, he said, revealed that the steel had been bought by a prefabricated home builder under government priority. Apparently it had been disposed of by the priority holder to a broker. That there is some diversion of priority steel is conceivable, but government officials deny any large abuse of priorities, pointing out that numerous reports of such have been investigated, the FBI looking into some of them, with little evidence of criminal diversion unearthed.

Considerable steel is believed getting into the hands of speculators through disposal of excess stocks of manufacturers who find themselves carrying larger inventories than they need, or think prudent. In this connection, some manufacturers are said to have found it morprofitable to sell their steel inventories at fancy prices to brokers than to engage in their regular manufacturing function.

The following story, related to STEEL's Detroit editor by a small Detroit manufacturer, shows how these steel broken are operating.

The manufacturer was approached by two individuals offering a tonnage of flat rolled steel for his stamping plant.

"I was in my Detroit office one morning recently," the manufacturer said "when these two gentlemen whom I had never seen or heard of before came is and asked to talk with me about steel Since I was sorely pressed for 16-gag cold-rolled sheets for my stamping operations I gladly consented to talk with them

"They said they were contacting small manufacturers in Detroit in need of steel and could let me have up to 2000 tons of the grade I needed. When I asked about the price, they said they would prefer to meet me in a Chicago hotel the next day and show me the steel first. I agreed to meet them at the specified place and time

"They were on hand as promised and we took their car to an old warehous building on the South Side which had no marking or other identification. We went in, and the only human inhabitants were three watchmen, not the mildest looking individuals I had even seen. However, there were bundles of sheet steel piled to the ceiling, I would guess in the neighborhood of 50,000 tons.

"I asked about the price and they said they would talk about that later. I could have the material delivered to my plant by their trucks, with transportation charges to be paid to the truck drivers.

"Just before leaving I asked what mill this sheet stock came from and one of the 'brokers' replied, We'd just as soon you did not ask questions of that sort.' They agreed to meet me at my hotel room later to discuss price. Since I was alone, I was glad to get out of their warehouse and back downtown.

"At the appointed time they knocked at my hotel room. I had asked the assistant manager of the hotel to be present. Finally getting down to price, they told me I could have the steel on the basis of \$230 per ton, if I paid by check, \$170 per ton if by cash-and no questions asked.

"Not wishing to be a party to any such price hold-up. I minced no words in telling the two individuals just what I thought of them and their 'deal,' winding up by inviting them to 'get out.'

"That's all, except that it is the first time in one of these offers I have had the chance to see any steel. They had it and plenty of it; and for my money it was no surplus or warehouse stock, or re-routed export material.

"What I'd like to know is where a couple of guys like this, whose names were probably fictitious and with no listing in any recognized directory, can get hold of all the steel they had loaded in that old building. Something's rotten."

Regardless of the source of this "gray" market steel, there is no question legitimate steel sellers are getting a "black eye" from the operations of the speculators since buyers are prone to blame the mills and the warehouses for conditions. Just what can be done to correct the situation is as much of a puzzle to the mills as it is to the buyers since they have no control over free metal. Their chief hope is that supplies now in the hands of brokers will be quickly dissipated. However, last week, Tom L. Smith, executive vice president, Pressed Metal Institute, said reports to him indicated the spot delivery market, in which the "gray" steel brokers operate, is not quieting appreciably. He said that a New York state lawyer has been contacting steel users in an effort to dispose of a 10,000-ton lot of 16 and 20gage sheets at \$218 per ton. This \$2,-180,000 offering, he said, was tendered as a unit and could not be divided.

Departure from Prewar Pattern Of Steel Distribution Claimed

EVER SINCE the Civilian Production Administration, at the request of the Office of Defense Transportation, sponsored the voluntary allocation arrangement under which the steel mills are to furnish more tonnage for railroad freight car construction, there have been rumblings of discontent from other classes of consumers who have received no such CPA assistance and have been left to conduct their own negotiations with the steel industry.

Some of these consumers, in their efforts to enlist help in their steel procurement problems, have complained bitterly that they are not receiving as much steel, in proportion to production, as they received before the war.

Statisticians who have gone to the trouble of making some calculations claim that there is a basis for such complaints. Using the American Iron & Steel Institute's production figures for the first 10 months of 1946, and what they know about the current steel distribution, they hold that certain industries are receiving a considerably smaller percentage of steel than they received before the war, while certain other industries are getting a much larger percentage.

The figures are claimed particularly interesting for steel sheet and strip. They show, it is said, the automobile industry of late has been getting approximately 30 per cent of current sheet and strip output as compared with 40 per cent before the war. Railroad users of late have been receiving 2 per cent of the sheet and strip as compared with 2.5 per cent prewar. Recent exports have accounted for 2.5 per cent of the sheet and strip as compared with 6 per cent prewar.

On the other hand, miscellaneous manufacturers who convert sheet and strip into a thousand and one different products have been getting 8.5 per cent of the tonnage of late compared with 5 per cent prewar, while the percentage going to jobbers and warehouse interests has increased from 8.5 to 10.5. Likewise, manufacturers of building materials have been getting 10.5 per cent of the sheet and strip output in recent months compared with 6.5 per cent prewar.

February Steel Output Off From High January Level

Production of steel declined slightly in February from the all-time peacetime high established in January, operations easing to 91.9 per cent of capacity from 93 per cent due to material shortages, according to the American Iron & Steel Institute.

Output of ingots and steel for castings last month, however, at 6,430,674 net tons, was almost five times the total for the like month a year ago, when operations were sharply curtailed as a result of strikes. January output amounted to 7,212,677 tons.

STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1946 made 97.6% of the open hearth, 100% of the bessemer and 85.8% of the electric ingot and steel for castings production

		Hearth- Per cent	→Be t	ssemer- Per ce	El ent	ectric— Per ce	nt	otal—— Per cen	produc- t tion all	Num- ber of
1947	Net tons	of capac.	Net tons	of capa	e. Net	of capa	Net c. tons	of capac.	companies Net tons	
Jan	6,544,841	95.1	384,096	87.7	283,740	65.8	7,212,677	93.0	1.628.144	4.43
†Feb	5,836,517	93.9	314,193	79.5	279,964	71.9	6,430,674	91.9	1,607,669	4.00
1946										
Jan	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
Feb	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st qtr	10,775,732	53.8	597,366	47.0	398,520	29.4	11,771,618	51.9	915,367	12.86
Apr	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May June	3,699,979 5,145,594	53.6 77.0	153,409 251,253	35.0 59.2	219,064 227,979	46.9 50.4	4,072,452 5,624,826	52.2 74.4	919,289 1,311,148	4.43 4.29
			690,750	53.7	688,074		15,557,536	67.9	1,195,814	13.01
	14,178,712	69.9				50.1				
	24,954,444	61.9 1 87.5	1,288,116 365,332	50,4 83,6	1,086,594 228.083	39.8 48.9	27,329,154 6,617,214	59.9 84.9	1,056,403	25.87 4.42
July	6,023,799 6,287,617	91.1	373.837	85.4	261,755	56.0	6,923,209	88.7	1,562,801	4,43
Sept	5,947,688	89.2	371,465	87.8	235,054	52.1	6,554,207	86.9	1,531,357	4.28
3rd qtr	18,259,104	89.3 1	1,110,634	85.6	724,892	52.3	20,094,630	86.8	1,530,436	13.13
9 mos	43,213,548	71.1 2	2,398,750	62.2	1,811,486	44.0	47,423,784	69.0	1,215,994	39.00
Oct	6,308,845	91.4	387,933	88.6	253,562	54.3	6,950,340	89.0	1,568,926	4,43
Nov	5,869,767	87.8	318,350	75.1	268,655	59.4	6,456,772	85.4	1,505,075	. 4.29
Dec :	5,283,651	76.7	222,704	51.0	253,353	54.3	5,759,708	73.9	1,303,101	4.42
4th qtr	17,462,263	85.3	928,987	71.5	775,570	56.0	19,166,820	82.8	1,458,662	13.14
2nd 6 mos.	35,721,367	87.3	2,039,621	78.5	1,500,462	54.1	39,261,450	84.8	1,494,536	26.27
Total	60,675,811	74.7 3	3,327,737	64.6	2,587,056	47.0	66,590,604	72.5	1,277,150	52.14
	minary.									

Freliminary.

For 1947 percentages are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 bessemer, and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons.

For 1946, percentages are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of Jan. 1, 1946, as follows: Open hearth 81,236,250 net tons, bessemer 5,154,000 net tons, electric 5,500,290 net tons, total 91,890,540 net tons.

Arguments Against Freight Rate Cut from Geneva to Coast Heard

Interstate Commerce Commission takes testimony in action seeking permanent suspension of proposed reduction in steel rates from Utah plant to Pacific Coast points. Tariff temporarily suspended pending consideration of protests

ORAL ARGUMENTS were made last week before the Interstate Commerce Commission on the proposed 31 per cent reduction in rail freight rates from Geneva, Utah, to key Pacific Coast consuming areas.

These hearings resulted from suspension by the commission during March of the scheduled reduction in freight tariffs filed by five western railroads. Final ICC action is indicated soon on: (1) Whether the suspension should be vacated; (2) If vacated should the rates become effective and the investigations continue; (3) Should the rates be suspended for 7 months and an investigation conducted during that period.

Counsel for the four western roads at the opening of the ICC hearing said the Kaiser Co. used "mental acrobatics" in charging the proposed rate reductions would discriminate against Kaiser's Fontana plant, arguing that no rate relationship ever existed between rates from Utah and transcontinental. It was maintained the rate adjustments from Utah to West Coast points have always been independent of transcontinental rates and that it does not follow that adjustments will lead to a breakdown of rate structures. None of the railroads proposing the reduced rates serve the Fontana plant.

RFC Shows Interest

An interesting development in the case is the fact the Reconstruction Finance Corp., while not formally participating in the action, in two letters to the ICC has expressed interest in the matter. However, it was made clear that to term the RFC letters as a protest on behalf of the Kaiser interests was incorrect, Formally protesting the proposed rate reductions are Henry J. Kaiser for his Fontana, Calif., steelworks, the Colorado Fuel & Iron Corp., Denver, the Sheffield Steel Corp., Kansas City, Mo., and leading eastern steel producing interests including Bethlehem Steel Corp., Bethlehem, Pa., Republic Steel Corp., Cleveland, Youngstown Sheet & Tube Co., Youngstown, and Jones & Laughlin Steel Corp., Pittsburgh. In addition, such interests as the Spokane Merchants' Association and the Intercoastal Steamship Freight Association are participating.

The concern of the RFC in the mat-

72

ter is traced to its loan of \$123,305,000 to Kaiser for construction of the Fontana plant and its conversion to peacetime production. Kaiser has repaid \$18,-000,000 in principal and \$9,300,000 in interest to the present. Originally, the loan, made in 1942, was for \$111,805,000 on a 10-year note bearing 4 per cent interest. In May, 1945, Kaiser asked revision of the loan terms and for additional capital. RFC advancing him an additional \$11,500,000. Of the then outstanding \$114,000,000 a total of \$79 million was made a 15-year, 4 per cent first mortgage note and the balance was covered by a second mortgage, non-interest bearing note. A 2-year period of grace on principal payments ending June 30, 1947, was included.

With the expiration date for the grace period approaching, the Kaiser Co. is understood to have started new negotiations with RFC for further revision of the loan terms. Annual payments on the loan, it is said, require the company to set aside \$10 from the revenue of every ton of steel produced. Kaiser is said to be seeking a 30-year repayment plan if possible.

As a result of its loan interest in the Kaiser steelworks, RFC is participating in the freight rate protest claiming lower rates from Geneva will ruin competing steel companies on the Pacific Coast, fearing that the competitive situation may prevent Kaiser from fulfilling the terms of his loan.

Arguing for the railroads at the opening of the ICC hearing, John E. Hennessy said the RFC at one time had told the railroads that unless substantially reduced rates were published it could not ask Congress for additional appropriations to complete construction of the Utah plant. He said that after the war RFC repeated this request in order to interest prospective purchasers of the Geneva plant.

The present rail rates on iron and steel products are 70 cents per 100 pounds (excluding 3 per cent transportation tax) from Geneva to Los Angeles, San Francisco and Portland and 76 cents to Seattle. They are the prewar paper rates of 60 and 66 cents respectively, which moved no traffic of any account because there was no steel production in Utah, plus the Ex Parte 162 increase of

10 cents effective Jan. 1 last. West Coast steel consumers hold it would be unjust to require them to pay these rates during pendency of a rate proceeding which might be of protracted duration.

The freight rates proposed by western railroads are 48 cents to Los Angeles, San Francisco and Portland, and 54 cents to Seattle. During the war special government rates of 40 cents to Los Angeles and San Francisco, 47.5 cents to Portland, and 50 cents to Seattle applied on steel shipments from Geneva.

Ever since construction of the Geneva steel plant, the railroads have been urged by West Coast steel users and public officials to publish a rate of not more than 40 cents in their tariffs on the ground it was the maximum rate that could be properly related to other freight rates within the same territory, and the most feasible rate consistent with healthy development of the West Coast economy.

Geneva Steel Presents Arguments

In its reply to petitions of interests seeking to have ICC permanently suspend the proposed freight rate reduction. Geneva Steel Co., U. S. Steel subsidiary, stated such suspension would be disastrous to the commercial operation of the Geneva plant, to users of the Pacific Coast and to the western economy. The company further contended that steel producers in the East and Midwest prefer to keep the rates from Geneva high as a means of retaining the highest possible market prices on the Pacific Coast so they can ship from the East with minimum freight absorption. Intercoastal carriers wish to keep the rates from Geneva high to encourage steel shipment from the East via their vessels. Steel producers with plants located in the Pacific Coast area also oppose the proposed freight rate reduction from Geneva in their effort to maintain high market prices for their products which they can ship to Pacific Coast markets at rates lower than those from Geneva.

Eastern steel consumers pay a base price of \$2.65 per 100 pounds for plates and \$2.50 for shapes, plus a relatively small freight charge. Steel fabricators at Los Angeles and San Francisco have to pay \$3.35 for shapes, made up of the Geneva base price of \$2.65 plus 70 cents rail freight. On plates they have to pay \$3.43 at Los Angeles and \$3.42 at San Francisco, made up of the price at Sparrows Point, Md., plus the cost of transportation and delivery. On plate shipments from Geneva the price would be \$3.50; made up of \$2.80 base plus 70 cents freight.

Norris Stamping & Mfg. Co., Los Angeles, stated in its petition favoring the freight rate reduction that heretofore

he quoted delivered prices on shapes nd plates at Pacific coast ports have een prices which were the eastern mill ase prices plus (substantially) rail-water r water transportation costs. Eastern roducers seek to perpetuate this price olicy "umbrella" and hope at least to ain through a suspension of the proposed ate reduction a delay in the inevitable ricing of steel in the West on basis of estern base price plus reasonable freight ates. The proposed freight rate reducon from Geneva would have the effect f reducing these delivered prices to 3.28 on plates and \$3.13 on shapes.

This company further commented that ne proposed decrease in rail freight ites from Geneva to Pacific ports does ot accrue to the Geneva Steel Co. but West Coast metalworking plants rough reduction in delivered price. The ompetitive market prices on the Pacific oast are directly dependent upon the eight rates from Geneva.

Railroads State Position

The petition filed in behalf of the six ilroads, seeking to put into effect the il rate reduction, by the Pacific Freight raffic Bureau, San Francisco, made the llowing points:

If finished steel produced by the Geva mill cannot be sold in the Pacific oast market at the Geneva mill price, us the transportation cost, without abrption by the mill of part of the transortation charges, it is natural to exet Geneva to confine the sale of the ished steel to other markets where this n be done, and sell in the Pacific Coast arkets only the unfinished steel, such as g iron, billets, etc., and export steel which the rates are substantially lowand no absorption of any part of the insportation cost is necessary, deprivthese carriers of much needed revue. This also would contribute to the vere shortage of steel in the Pacific ast which these carriers hope and exct these rates to help alleviate. Furermore, there are many industries now nsidering the establishment of new or larged plants on the Pacific Coast, which these rates are vital if they are be in position to compete fully and cessfully with industries located in East, manufacturing the same comdities, and having the advantage of ver priced steel and low water transtation costs. If the effectiveness of se rates is delayed, some of these posed new or enlarged plants will be efinitely postponed or definitely indoned, both to the detriment of the riers and at the expense of expanded duction, which is needed so urgently this country right now.

The proposed rates would give to these

railroads an opportunity to move a large volume of traffic which they had not previously enjoyed, and the rates are not unreasonable when tested by the usual standards. Further, there is not now. and never has been, any relationship between rates from Utah to the Pacific Coast, on the one hand, and rates in other territories, and it therefore does not follow that the transcontinental rates would be broken down as a result of these publications. The proposed rates are not in violation of any provisions of the Interstate Commerce Act.

The proposed rates would not only cover all out-of-pocket costs, but would cover all costs however figured, and in addition would net the railroads more revenue produced by other traffic of these carriers. It is more advantageous to the carriers to transport finished steel from Geneva to Pacific coast destinations than to ship semifinished steel to Columbia Steel Co.'s plants.

If the proposed rail rate from Geneva is not granted, Geneva Steel Co. possibly would reconsider its plans to complete the manufacture of steel. Instead Geneva Steel's output might be restricted to semifinished steel products which would be shipped to the Torrance and Pittsburg, Calif., plants of Columbia Steel Co. for conversion into finished steel. Geneva Steel Co. is already doing this to a large extent. There is a substantial movement of billets to the Pittsburg plant for conversion into wire rods and hence into wire and wire products. Geneva ships pig iron to the Torrance and Pittsburg plants of Columbia Steel Co. and also to the Pacific Coast plants of other basic steel producers.

Freight Tables Transposed

In an article on freight rates in the March 3 issue, STEEL, page 94, two single column tables dealing with freight rates to southern points were transposed. Thus, the rates from Birmingham, Ala., were shown as being from Sparrows Point, Md., and those from Sparrows Point as being from Birmingham.

Cement Basing Point Case To Be Reviewed

Supreme Court to hear government appeal of Circuit Court of Appeals decision upholding industry's pricing practice

SUPREME COURT last week agreed to hear a complaint by the Federal Trade Commission alleging violation of the Clayton antitrust act, and illegal pricing actions against associations and individuals representing the bulk of the cement industry of the country.

The case reached the Supreme Court through a petition of Federal Trade Commission following a reversal of the commission in a lower court. No date has been set for the Supreme Court hearing, but one may be set at this session.

The Federal Trade Commission has fought the action through various court proceedings and hearings before the commission itself, since July, 1937. At that time it brought proceedings against Cement Institute, some 75 corporations producing and selling cement who were members of the institute, and various individuals.

The Commission complaint charges violation of the Clayton Act, also that the cement companies had formed a combination under which cement was sold under a multiple-basing point system of pricing which results in every producer having the same delivered price at any given destination point; that delivered prices varied from locality to locality without reference to transportation cost differences, and resulted in discrimination in price between purchasers in different localities.

On Sept. 20, 1946, the Seventh Circuit Court of Appeals decided against the Commission, with the result the latter appealed to the Supreme Court.

Calendar of Meetings . . .

March 17-19, American Institute of Mining & Metallurgical Engineers: World Conference on Mineral Resources, Waldorf-Astoria, New York. Headquarters are at 29 W. 39th St., New York.

Mar. 17-19, American Society of Lubrication Engineers: Annual meeting, William Penn

Engineers: Annual meeting, William Penn Hotel, Pittsburgh. Program chairman is H. E. Mahncke, 135 S. LaSalle St., Chicago. Mar. 19-21, Iron and Steel Division and Institute of Metals Division of AIME: Annual meeting at Hotel Pennsylvania, New York. Secretary is Ernest Kirkendall, 29 W. 39th St., New York.

St., New York.
Mar. 19-22, National Screw Machine Products
Association: Annual meeting at Hotel Cleveland, Cleveland. Association secretary is

Orrin B. Werntz, 13210 Shaker Sq., Cleve-

Mar. 19-22, American Society of Tool Engineers: 15th annual convention, Houston, Tex. So-ciety headquarters are at 1666 Penobscot

ceety headquarters are at 1000 Penoscot Bldgs, Detroit 26.

Mar. 22-27, American Society for Metals: Western Metal Congress and Exposition, Oakland, Califs, civic auditoriums. Headquarters of the society are at 7301 Euclid Ave., Cleveland 3. Apr. 9-11, Society of Automotive Engineers: Spring aeronautic meeting, Hotel New Yorker, New York.

Amer. 28-May 1. American Foundrymen's Asso-

New 107K.
Apr. 28-May 1, American Foundrymen's Association: Annual convention, Book-Cadillac and Statler hotels, Detroit. Association head-quarters are at 222 W. Adams St., Chicago.

United States delegation to world trade conference at Geneva to seek to negotiate reciprocal trade agreements with 17 countries and to complete plans for International Trade Organization under United Nations sponsorship

GOVERNMENT men who will carry the ball for the United States at the world trade conference to start in Geneva, Switzerland, Apr. 10, are optimistic as they approach their double-barreled objective. First aim is to complete the plans for an International Trade Organization to be set up under sponsorship of the United Nations. The other aim is to negotiate reciprocal trade agreements with 17 countries.

Completion of the first of these tasks should be relatively easy, for the plans for the International Trade Organization were brought to an advanced stage at the preparatory conference that was held in London last fall. At that time agreement was reached on the more controversial points to be included in the ITO charter, and those remaining for consideration are regarded as being of minor character.

Nor should the second task present

any deeply-rooted controversial snags, for the agreements already reached in regard to provisions of the charter of the proposed ITO dress the stage for the reciprocal trade treaties.

One sour note is heard, however, as the foreign trade experts prepare to go to Geneva. It springs from resentment over charges that they are going to give away Uncle Sam's shirt; particularly charges that they will destroy the United States tariff setup and put this country on a free trade basis as far as imports are concerned.

A State Department spokesman told STEEL, members of the delegation that will go to Geneva intend to drive some hard bargains with the other countries and bring home treaties with which American businessmen will be well pleased.

"We will take over about 100 to 125 men," this spokesman said, "all of whom

devote their full time to tariff and feign trade studies. This group will clude experts who should be able answer all questions that will come during the horse-trading sessions. On men not only are well trained, but the have given a good account of themselvin dealing with foreign countries in the past. Many of them enjoy a lot of pretige and respect abroad; they are the regarded as 'easy marks.'"

Many American businessmen want to go along with the American deleg tion to serve in an advisory capaci The State Department vetoed this su gestion when it found that several hu dred businessmen would have to taken along in order to represent lines of business, and that it would ha been difficult to choose men fully a ceptable to the many industries involve Also, such a large group, the departme feared, would prove cumbersome a would add to the housing problem Geneva. The principal reason for i jecting the idea was that every busine man is prone to look at the overall p ture from his own individual point view; government men trained to lo at the economic picture as a whole, was felt, would have no special axes grind and would be more likely to for the general good.

Clayton Will Head Delegation

The Geneva conference, it is estimated, will last about three months. The American delegation, which will have offices in the League of Nations Palax will be headed by William L. Clayto Undersecretary of State for economic fairs. But Mr. Clayton will be at Gene off-and-on, when his presence is a quired. His chief-of-staff at Geneva when Clair Wilcox, director of the State Department's Office of Internation Trade Policy. Mr. Wilcox will steer the proceedings and will be on hand at a times to render decisions on all excepting top policy questions.

The United States is going to Gene with the intention of reducing numero present tariff rates.

"The United States will reduce tar rates," says Mr. Wilcox, "but the redutions will be selective and will be wit in the limits set by the Reciprocal Trac Agreements Act. The reductions where we have to purchase equivalent redutions in foreign tariffs and in other bariers to trade. This is precisely who was contemplated by the Congress whit renewed and strengthened the Trac Agreements Act in 1945."

But the principal drive of the Unit

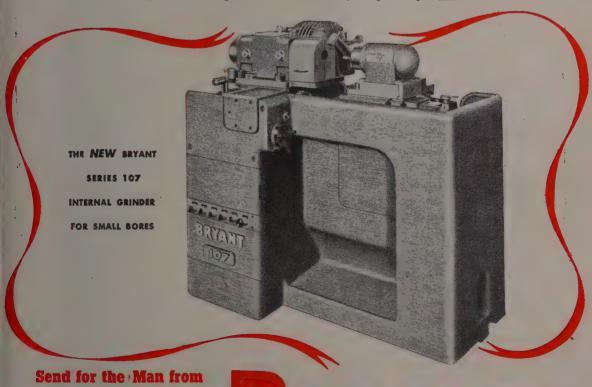


URGE PROMPT RATIFICATION: Appearing before the Senate Foreign Relations Committee, former Secretary of State James F. Byrnes, center, and Secretary of State George C. Marshall, right, recommended prompt ratification of the first peace treaties of World War II—those for Italy, Bulgaria, Rumania and Hungary. They are shown with Sen. Arthur Vandenberg (Rep., Mich.), chairman of the committee. NEA photo



fficient plants use machines specifically designed for a certain range of work sizes. For greatest efficiency in the grinding of small holes (1/2" to 3"), Bryant offers the new, small Series 107 Internal Grinder. • The Series 107 is designed for tool room and small lot grinding. It has a chuck swing of 9 inches, a maximum traverse stroke of 6 inches and a maximum grinding stroke of 4 inches. Provision can be made for 11" swing. Preloaded ball bearings are used on both cross and longitudinal slides. This allows the use of a very light wheel slide, yet provides the utmost rigidity and sensitivity necessary for extremely precise work with quality finish. The new Series 107 uses the Bryant High Frequency Wheel Head as standard equipment. This provides direct wheel spindle drive at speeds up to 100,000 r.p.m., assuring the efficient surface speeds so necessary when grinding small bores. Belt drive is available for slow speeds.

Although a minimum of floor space is required, operator comfort has been carefully considered. The simplified controls are conveniently located, and 'the operator may operate the machine, either when standing or sitting. Write for complete details on this new, small internal grinder that is functionally designed to grind small bores.



BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

BRYANT



States will be to knock out foreign quota systems,

"Under a quota system," says Mr. Wilcox, "the volume of trade is rigidly fixed. A country may say, for instance, 'During the month of March, we will take 57 automobiles; 11 from France, 17 from England and 29 from the United States.' And that is all that comes in; not a single one above those numbers is admitted. That is the worst thing that could possibly happen to the trade of the United States. If we are to be faced with quotas all around the world, we shall have to bargain our way into foreign markets, country by country, product by product and month by month. We would have to set up a sizable bureaucracy to carry on the continuous negotiations that would be involved, and we would be under great pressure to increase our bargaining power by establishing an import quota system of our own. The quota system and the private enterprise system do not go together. We want to allow the American businessman to buy and sell whatever he chooses, at the time and price he chooses.

Mr. Wilcox seeks to allay the fears of some manufacturers who fail to realize that the plan involving tariff reductions is aimed at increasing our foreign trade.

"Let us assume a case where the share of business enjoyed by an American producer actually declines; even then he still may be better off than before, for a larger share of a smaller market may bring less business than a smaller share of a larger one. Ninety per cent of \$100 millions in sales is \$90 millions. Eighty per cent of \$150 millions in sales is \$120 millions."

The reciprocal trade agreements program will be completed at Geneva excepting for President Truman's signature; this will be but a matter of form. No trouble from Congress is expected.

While negotiations for reciprocal trade treaties may be pushed to completion at Geneva, that is not true of the actual setting up of the proposed International Trade Organization. The American delegation can enter only tentatively into agreement on the ITO charter provisions; the whole program will have to be submitted to Congress for approval before it can become binding on the United States. In view of the fact that the Republican leadership has gone on record as approving the proposed ITO setup in the interest of world peace and prosperity, this approval probably will be forthcoming.

Patently a Must Decision

One of the congressional assignments which Secretary of State George C.

Marshall took along to Moscow for discussion with the Russian government is the existing one-way patent situation under which the USSR obtains copies of all our patents without giving us any such return courtesies.

The matter was looked into by the House Committee on Un-American Affairs and reported in detail to the House by the committee chairman, J. Parnell Thomas (Rep., N. J.).

The Russians, he reported, have bought

LOBBYISTS

Registry book of the House of Representatives definitely shows the number of lobbyists is much smaller than had been thought. Only 544 had registered up to Mar. 1.

Of the total, 239 speak for some segment of industry, while 121 represent labor organizations. Twenty veterans' lobbyists are enrolled, while 20 represent religious organizations, and 8 educational organizations. The Townsend National Recovery Plan Inc. is the best represented—with 35 registrations.

Top income is \$65,000 per year, paid to a representative of the National Association of Electrical Companies. Many lobbyists are unpaid volunteers. One reports he lobbies for "self"—seeking damages for war losses. One represents the True Order PMA for UTU, which stands for "True Order Perfect Mutual Aid for Unveiling the Universe for Prudent, Moderate Americans, for Perfect Metal Age, for Proud, Modest Americans, for You Too."

copies of hundreds of thousands of our patents and even have called on our patent office for all German patents for 1941, 1942, 1943 and part of 1944. Their agents who ordered these patents, said Mr. Thomas, include the Four Continent Book Corp., 253 Fifth avenue, New York, the Amtorg Trading Corp., 210 Madison avenue, New York, the Soviet Government Purchasing Commission, 210 Madison avenue, New York, also the Soviet Legation in Ottawa, Canada.

"They have succeeded in obtaining practically every industrial, chemical, and military patent from our patent office—hundreds of thousands of them—dealing with every phase of our technological development. They have ordered as many as 60,000 in one request. And what have we received in return? Nothing. Since 1927 Russia has refused to give us a single patent, yet we have obligingly

handed to them in this one-way change, our industrial and military k how. That is the way Russia uses allies. They are mere birds to be pi clean and get nothing in return.

"If our government is to survive, folly and legal espionage must cease, sider how ridiculous we are to pe Russia to have in this country at this moment 3696 official agents, whil Russia we have approximately 210 pe and that includes our embassy emplo UNRRA, Red Cross, the Army and Mand their wives and dependents. I wike Secretary Marshall to cite this reas an example of the type of co-oper we are receiving from Moscow."

Mr. Thomas cited a long list of mil patents the Russians have obtain covering airplanes, parachutes, deportable machine-gun emplacements many other military items, as bomb si pilot directors, range-finding and fi director apparatus.

Pruning Proving Tough Job

Many Republicans in Congress become convinced they will make r less progress than was promised in year's election campaign in redu government expenses — so essention order to permit reduction in taxes are the national debt.

The difficulties besetting the atte to economize were illustrated when House Appropriations Committee repo out its first appropriation bill for year—for the Treasury and Post O departments.

Despite its economy mood, the mittee was able to cut only \$897 lion from President Truman's but \$800 million of the anticip saving is based on a hoped-for declir income tax refunds—and the materiation of this hope is not at all certain

The committee reported \$1,671,317 for the Treasury, reduction of \$882,750 from the President's budget fit. For the Post Office it recommer \$1,530,733,250, a reduction of only \$356,000 from the President's estiment And, with hearings on the second third-class rate-raising Rees and Labills beginning last week the externation that proposed saving will stammains to be reviewed when request deficiency appropriations begin to made up late this year.

But the development which has carreal pessimism in regard to the alto make good on the economy pled the series of events on the internatifront. Financing of the present Government, it is feared, is to be only first of a number of new drains American taxpayers' funds.

British Plants Reopen as Fuel Supply Improves

Industry still operating under difficulties as coal situation continues unsatisfactory. Half million lost worktime

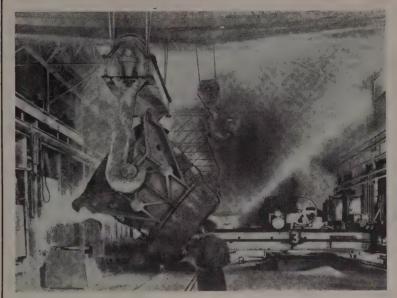
BIRMINGHAM, ENG.

FUEL situation in Britain is improving but iron and steel producers are still working under great difficulties. Many works have re-opened in the Midlands after a fortnight's closure because of the switching off of the electric power out it may be a long while before coal supplies can be considered anywhere near satisfactory. Despite severe weather conditions, coal has been moving from he pits to the industrial areas by sea and and. As a result the position has continued to improve and stocks at power tations are gradually being built up to the minimum level of two weeks' consumption.

In the Midland area about half a illion workers were idle for a fortnight nd the power cut is estimated to have aused the loss of about \$40,000,000 worth of export trade. The big automoile makers in the Midlands are startng up again but on an inadequate coal tion. Managing Director L. P. Lord f the Austin Motor works said the other ay, referring to steel: "The position is ot as bad as it appeared a few weeks go. From some angles it is better. At ae shareholders' meeting I said we ere likely to be held up for steel. The eel position has got a bit easier. I think e shall be able to carry on without ducing production and we may be able increase it." Referring to coal, he exessed the view that the works might ave to close one day a week because of sufficient supplies.

Meanwhile, industry faces yet anher crisis in regard to the use of coal is. The Ministry of Fuel has issued arnings that it may be necessary to imise cuts similar to those in force in the ectrical industry. Gas companies have ready taken measures to secure the per cent cut in coal consumption dered by the Minister of Fuel and wer. According to the latest informan, however, stocks of gas coal have en during the last few days from 11 to days' supply.

Owing to the growing congestion of siness in the steel trade, orders for ites, joints, sections and bars are to be fiewed. The decision applies to bookgs placed before "Period Three" of last



AUSTRALIAN STEEL: Molten steel is poured into molds at the Broken Hill Pty. Ltd. plant at Newcastle, New South Wales, Australia

year and to enable the survey to be made; work which cannot be executed by makers by the end of March will be canceled automatically. Examination of the circumstances and priority status of the large volume of these orders will be a heavy task, but no other method of dealing with the existing situation is considered feasible. It can be taken for granted that all work now in hand is of

an essential nature; otherwise the necessary permission for its execution would not have been granted. The market will escape the effects of duplication and overlapping.

Rerollers have restarted work on a modified scale. During the shortage there has been a limited accumulation of billets and sheet bars from areas not affected by the power cut.

Largest South African Steel Producer Plans \$60 Million Expansion Program

EXPANSION plans by South Africa's largest producer of rolled and drawn steel products, South African Iron & Steel Industrial Corp. Ltd., are under way in an attempt to overcome the deficit of supply to demand in that country, according to information supplied the Office of International Trade, Department of Commerce, Washington.

The Union's total steel production for the year ended June 30, 1946, was 525,042 tons, which, although a 6812-ton increase over output for the preceding year, was estimated as being at least 400,000 tons under current demand. South African Iron & Steel, also known as Iscor, produced 392,096 tons of rolled and drawn steel during this period, an increase of 32,673 tons over the previous year.

Iscor's expansion, already begun with a plate mill at Vanderbijl Park, will include a steelworks, additional finishing capacity and extension of iron and coal mining facilities. Approximately \$60 million will be spent on the program.

The projected steelworks, which will incorporate the new plate mill, will include a coke oven plant, a blast furnace, steel melting shop, slabbing mill and continuous hot and cold strip mills. Anticipated ingot capacity of between 320,000 and 350,000 tons a year presupposes an annual output of about 240,000 tons of flat rolled products.

Finishing facilities which are planned will include equipment for shearing, annealing, pickling, galvanizing and tinning. Plans for the plant allow for further expansion up to an ingot capacity of approximately 1 million tons a year.

At Iscor's Pretoria plant, rolling mill and finishing facilities will be expanded so that steel now used in making sheets can also be used to make other rolled steel products.



Cleveland Area Absorbs War-Born Plan

Expansion program pushes employment to peacetime high. District's industrial production in 1947 and 1948 may exceed wartime volume. Only three government-owned plants remain jdle

CLEVELAND

POSTWAR planning initiated by Cleveland industrialists long before the war ended has resulted in the absorption of most of the government-built plants in northeastern Ohio, in the construction of new plants and in making a larger number of steady peacetime jobs available for workers.

Largely responsible for development work which has placed the Cleveland area in a strategically better position industrially than many other sections of the nation are Elmer L. Lindseth, president, Cleveland Electric Illuminating Co. and chairman of the local Committee for Economic Development; Frank J. Ryan, assistant to vice president of the company, and Robert C. Hienton, director of its industrial development division.

In a little more than the year and a half elapsing since V-J Day, more than 170 companies have committed themselves to investing \$50,000 or more each, aggregating over \$210 million, in new or expanded plants in the 1700 square mile area extending 100 miles along the southern shore of Lake Erie from the Ohio-Pennsylvania line at Conneaut to Avon Lake Village, 20 miles west of Cleveland and close to Lorain, O.

According to Mr. Ryan, this expansion

program already has created 32,000 additional jobs, and employment now is at a new peacetime high. He would not be at all surprised if industrial production in the Cleveland area in 1947 and 1948 exceeds the annual \$3,400,000,000 wartime volume reached in 1943 and 1944.

During the war, the area had government-owned plants providing more than 9,600,000 sq ft of floor space and employing over 60,000 workers. Only three plants remain idle. These are a chemical plant with 54,000 sq ft operated by the Ferro Enamel Corp.; the 237,000 sq ft National Aluminum Cylinder Head Co. plant and the 2,500,000 sq ft aircraft plant built at Cleveland Airport to turn out the P-75 fighter but later converted to production of B-29 assemblies.

Slogan Helps Boost the City

One company, offered a free plant in Kansas, was easily persuaded by Mr. Hienton to buy a government plant in Cleveland by applying the power company's nationally famous "Best Location in the Nation" slogan. Mr. Hienton showed that more favorable freight rates on raw and finished materials applying to a Cleveland plant would, in a short time, more than offset a "free" plant.

In following through with the "Best

Location" slogan, Cleveland's promot point out that the area is served by for lake ports which will assume engreater importance if the St. Lawrer waterway is constructed, as well as principal trunk line railroads; that is materials and component parts such steel, copper and brass, aluminum a magnesium, castings, forgings, stampin motors, bearings, electrical equipme etc., are available from plants close hand; and that a market represented 75 million persons is within 500 miles Cleveland.

Industrial growth of the area been overwhelmingly metalworking, fact, over 90 per cent of the plants in this category, the balance being larg in the chemical field. Following is brief resume of major projects:

Chevrolet-Cleveland Division of Geral Motors Corp. has purchased a substitial acreage in nearby Parma and Bropark for the construction of a plant wabout 2,500,000 sq ft of floor space a scheduled to require 11,000 workers turning out 1200 light cars daily. Ostruction may start this year, if the recial situation clears sufficiently. St for the buildings is reported already fricated.

Euclid Road Machinery Co. has copleted a new plant at a cost of \$1 lion and requiring 400 workers.

Fruehauf Trailer Co. is scheduled start operation of a new truck-traplant in Avon Lake this spring. It employ 3000 workers in producing trailers a day.



Cleveland's highly industrialized Cuyahoga Valley, with scores of steel, metalworking and chemical plants, is shown here. In foreground is the Cleveland Electric Illuminating Co.'s Clark substation, a center of power distribution

the Harshaw Chemical Co., Cleveland, has purchased part of the hypo-chlorite plant operated by the Diamond Magnesium Co. at Painesville for production of chemicals. The magnesium plant operated by Diamond Magnesium Co. is being held as a stand-by capacity for the government.

Thompson Products Co. has purchased a 1,095,000 sq ft plant operated for the government during the war. It makes jet engines as well as automotive and avia-

tion engine parts.

Electro Metallurgical Co., New York, has purchased for \$5,050,000 a ferroalloy plant it operated for the government during the war at Ashtabula. The
plant produces silico-manganese and calcium carbide. The National Carbide
Corp. plant is operated by the Rubber
Reserve Corp. A plant built at Ashtabula for the government by Lake City
Malleable Inc., Cleveland, now is operated under an interim lease arrangement.

Chase Brass & Copper Co. built a large wartime shell case plant for the government near its own rolling mill in Euclid Village. This has been purchased for \$5 million and is being converted to production of copper and brass products through the expenditure of several million additional dollars for equipment. It has 600,000 sq ft of floor space.

B. F. Goodrich Chemical Co. has purchased 325 acres near Fruehauf in Avon Lake and constructed a \$65,000 plant for initial operations. A \$2,500,000 research and development laboratory is being constructed by the B. F. Goodrich Co. at Brecksville, 15 miles south of Cleveland. Similar projects are planned by the Standard Oil Co. of Ohio and the Diamond Alkali Co.

Harry Ferguson Inc. has purchased a huge aircraft parts plant, operated for

the government in Euclid Village by Cleveland Pneumatic Aerol Inc., for the manufacture of farm tractors.

Predict Bright 1947 Picture For Industrial Construction

The volume of industrial engineering and construction will be higher in 1947 than in 1946 and may reach an all-time high as materials become more plentiful, prices become stabilized and government controls are relaxed. This is the consensus resulting from a survey of executives of H. K. Ferguson Co., industrial engineer and builder of Cleveland, New York and Houston, Tex. All the officials were unanimous in the opinion that building materials and labor would become increasingly available during 1947.

Mid-America Exposition Will Be in Cleveland May 22-31

The 1947 Mid-America Exposition will be held in Cleveland at the Public Auditorium, May 22-31, The show is designed to give industrialists, stylists, engineers, builders, purchasing agents and ultimate consumers a chance to study the new products, materials, processes and machinery produced in the area bounded roughly by Detroit and Buffalo, Pittsburgh and Cincinnati.

Construction in Chicago Area Increases During February

Industrial developments in the Chicago area totaled \$14,210,000 in February, exceeding by a substantial margin the \$11,885,000 value of such developments in the corresponding month one year ago.

lds Others

White Motor Co. has purchased a 1,000 sq ft gun site plant in Euclid age operated during the war by Genl Electric Co. The plant is being d for manufacture of busses.

Imken-Detroit Axle Co., Detroit, has ted construction of a new automotive ke plant at Saybrook, between Ashula and Geneva, O., on a 45 acrest. Initial unit will have 80,000 sq ft loor space and employ 300.

teliance Electric & Engineering Co., veland, is moving its Marine Division Ashtabula, where a 120,000 sq ft at costing \$1,500,000 is being conceed on a 20 acre tract. It will em-

Glenn L. Martin Builds Plant

denn L. Martin Co., Baltimore, is ding a \$3,500,000 polyvinyl chloride at at Painesville. It will purchase rogen and chlorine from the adjate plant of the Diamond Alkali Co. calcium carbide for producing ylene, a third raw material required, a the National Carbide Corp. of tabula.

willer Brothers Inc., St. Paul, well-wn in the iron ore trade also will advantage of low-cost hydrogen gas constructing a plant near the Diad Alkali Co. for production of electic iron powder. The plant, with 100 sq ft of area and employing 100 ons, will be one of the largest in the powder field.

iamond-Harshaw Co., wholly owned idiary of the Diamond Alkali Co. and



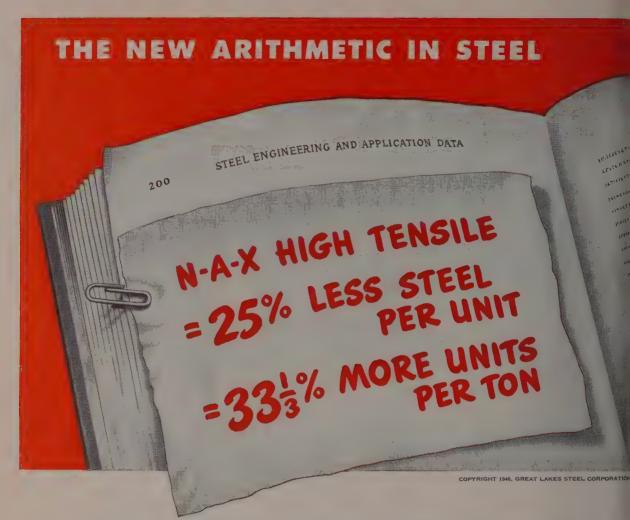
FRANK J. RYAN



ELMER L. LINDSETH



ROBERT C. HIENTON



You can make more and better products per ton by replacing carbon sheet steel with N-A-X High-Tensile

Today, many manufacturers are enjoying the important production advantages brought by N-A-X HIGH-TENSILE steel.

Because of its greater strength, toughness, fatigueand corrosion-resistance, this low-alloy, high-tensile steel ordinarily permits reduction in sectional thickness of as much as 25%. This means 331/3% more units per ton of steel—with actual improvement in the strength and durability of finished products. And because N-A-X HIGH-TENSILE steel has exceptional ductility for high-strength steel, it can be deep-drawn and formed into intricate shapes.

In addition to the savings in steel provided by N-A-X HIGH-TENSILE, economies in handling, fabri-

cating and finishing operations can often be effected

Tomorrow, N-A-X HIGH-TENSILE will be available in ever greater quantities and to a wider field of users. Even though current production can't always keep pace with demand, our engineers will be glace to show you how helpfully N-A-X HIGH-TENSILE steem can fit into your future production picture.



GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGA

Mirrors of Motordom

Supreme Court decision in Packard foremen unionization case means either Wagner Act must be revised or status of foremen changed. Decision will be observed "to the letter," but industry is agreed first line of management should not be unionized

DETROIT

N HIS dissenting opinion on the Packforemen unionization case, Mr. Justice uglas of the Supreme Court injected re than a note of humor when he I, "If a union of vice presidents apes for recognition as a collective barning agency, I do not see how we ld deny it.' This same crack was ng made around Detroit four years , and the culmination of lengthy ation over the matter in Washington week simply emphasizes that even Supreme Court cannot read into the gner Act a clear definition of what 'employee" is.

When the justice added the decision ads to emphasize that the basic oping forces in industry are not manment and labor, but the operating up on the one hand and the stockder and bondholder group on the er, and the struggle for control or ver between management and labor omes secondary to a growing unity their common demands on ownerp," he put his judicial finger on a cept far more fundamental than the ermination of whether foremen shall allowed to join a union. His stateat immediately called to mind the nomic philosophy outlined in James mham's celebrated volume, The Manrial Revolution, which for years has nished fuel for the politico-economic stove league of U. S. business and

Remedial Legislation Hoped For

The court decision will be observed the letter" by Packard, and the comy will proceed to bargain collectively h the Foreman's Association of Ameras representative of 374 foremen now ployed. However, President George Christopher observes, "The litigation cerned an act presently on our statute ks. It seems quite possible that prossive senators and representatives in 80th Congress will recognize our sent foremen are the front line of nagement, and will enact remedial islation designed to preserve the digy, authority and independence of these I other foremen throughout the coun-

Perhaps the incident will serve to rk plug the Congress into spelling out sessary revisions in the Wagner Act. If so, it will have been a good thing. If not, then it is reasonable to look for many basic organization changes in the path of supervision in motor plants, for managements are determined their first line of control in the shop shall not be unionized, whether an independent union or otherwise. Should foremen finally be-

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports
1947 1946

January	373,872	126,082
February	399,082*	84,109
March		140,738
April		248,108
May		247,620
June		216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December	, . ,	380,908
_		

12 ms. 3,268,456 * Preliminary.

Treummary.

Estimates for week ended:

Feb. 22	103,400	19,410
Mar. 1	105,175	17,575
Mar. 8	104,437	23,050
Mar. 15	106,000	35,020

come organized generally, then the obvious step would be to reduce their authority to that of group leaders and transfer their former responsibilities perhaps to assistant superintendents or some new category of supervision. Obviously, revision of the Wagner Act would be much the simpler procedure.

Allocation Tempest Subsides

The tempest over government allocation of merchant pig iron to southern stove and pipe foundries has subsided to a degree following decision to terminate certifications of tonnage after Mar, 31 on all housing items except soil pipe. It remains to be seen how much more pig iron this will bring into automotive foundry yards, because there is wide-

spread belief a contributing factor to the shortage also is a diminishing overall production of merchant pig iron resulting from the critical need of steel companies for iron to charge open hearths.

Nevertheless, out of total estimated merchant iron shipments for March of 397,000 tons, about 157,000 tons will be allocated, according to data supplied by the Gray Iron Founders Society. Against this figure, only about 38,600 tons was allocated for soil pipe, or less than 10 per cent of total shipments. This leaves an apparent margin of well over 100,000 tons which will come off allocation after Apr. 1. It is true the bulk of this tonnage was going to southern stove and pipe foundries, but it is also true that most of the tonnage was produced by blast furnaces in the South, and the foundries there are not going to make immediate switch back to scrap, as long as the latter costs \$10 per ton more than pig iron.

Answering complaints voiced by the automotive industry over unjust pig iron allocations, the Office of the Housing Expediter in Washington forwards figures on deliveries of merchant iron over the past few months, excluding the South (and this is an important exclusion). They show shipments of 310,900 tons in September, 336,100 in October, 318,600 in November, 299,500 in January, and an estimated 296,500 in March. These figures are compared with average monthly output of the same sources of 168,400 tons in 1939, 215,000 tons in 1940, and 280,000 tons in 1941.

Commenting on current deliveries, the agency says 68-75,000 tons have been certified (again excluding the South), and a check reveals these same allocated consumers would receive at least 50,000 tons without certifications. Thus, assuming they would receive that amount, the inference is drawn that other foundries, including automotive, would have received about 250,000 tons a month or nearly up to the peak 1941 deliveries. The agency concludes, "It is believed that compared with 1939, the automobile foundries are receiving far more (iron) now than then and probably about the same as in 1941."

Bonded Brake Linings

Comment appearing in these pages for Feb. 10 relative to experimental work in process on a method of bonding brake lining to drums, obviating the need for rivets, elicits information from the Permafuse Corp., Brooklyn, N. Y., to the effect it has developed a process of this type which has been used in the New



TWIN TRIM LINES: Where less than a year ago workmen were still removing bomber machinery, a pair of 2000 ft long Kaiser-Frazer body trim lines now complete 45 bodies an hour each

York area since 1941 and is now being made available to the automotive trade through distributors of Raybesfos-Manhattan Inc. Essentially the process involves the use of a bonding strip or tape impregnated with thermosetting plastic between the lining and the shoe. The tape is clamped securely in position and the assembly heated in an electric oven, the combination of heat and pressure effecting a bond between the two elements.

Special welded steel clamping rings and spreader jacks are used to hold the assembly firmly before heating for a period of 30 minutes. Four sets of shoes are accommodated at one time in the oven which has automatic temperature control. The plastic-impregnated tape is 0.007-inch thick, is supplied in different widths for different sizes of brake shoes, and is wound in 50-ft rolls,

Last week in Detroit, an industry trade paper, Automotive News, declared that bonded brake linings had made such rapid strides that one or more companies may announce their adoption as standard on new cars. The development is said to have caught the industry unprepared, as far as mass production is concerned, and the lack of sufficient holding fixtures, furnaces and related accessories might prove troublesome. One commercial service company in Detroit has been specializing in equipping taxicab fleets with bonded brake drums which were said to outlast riveted linings by nearly 85 per cent.

With bonded drums, of course, a great-

er area of lining is available (about 15 per cent) for braking action, as well as a greater effective thickness, since rivets cannot be countersunk any more than 50 per cent of the lining's thickness. Greatest difficulty with the process is in removing adhering portions of old lining from the brake shoes, common practice being to chisel off the surface with pneumatic tools and then sand it smooth. As a matter of fact, there is available a process for accomplishing this quickly and effectively with the use of molten alkaline salt baths, such as pioneered by the Kolene Corp. Scouring action of this cleaning method avoids the need for tedious hand operations.

February Output Up

Final tabulation on February production of GM cars and trucks shows 158,-028, compared with 123,152 in January. The total was still well below the postwar peak established in December of 174,489 units, but the current month should show further sharp improvement, and plans for April are looking toward still higher levels, Of February production, 111,433 were passenger cars and 46,595 were trucks.

Sees 3,500,000 Output

H. H. Curtice, Buick general manager, recently told a group of southern California dealers the industry would produce 3,500,000 passenger cars this year, against output of 2,200,000 last year. He also revealed that his own division's ex-

tensive postwar expansion and modernization program designed to increase cabuilding capacity 40 per cent over the 1941 model year level of 378,000 unit is nearing completion. It includes 1' new buildings and provides 2,324,000 sq ft of additional floor space for manufacturing, assembly, foundry, forge, shipping and storage operations.

Acquires Radio Plant

General Motors has announced arrangement of a lease with Clearing Industria District Inc., Chicago, for a factory recently operated by RCA Victor. It will be operated by the Delco Radio Division for manufacture of automotive and house hold radios.

GM To Build Foundries

General Motors has announced it will proceed at once with two new foundry projects which had been placed on the shelf for the past several months. One is a malleable iron plant at Danville, Illudiacent to a present gray iron foundry there. The other is a small parts gray iron plant at Defiance, O., both being operated by the GM Foundry Division It is hoped ground may be broken in a matter of weeks, and that the operation at Danville, at least, will be ready for production by the end of the year.

Demand Still Heavy

Spot checks conducted by various sources on the temperature of the passenger car retail sales market show it continuing feverish. The average buver is being quoted six months to a year on General Motors, Chrysler and Ford models, indicating dealers' customers lists remain lengthy. In most sales rooms there is scarcely any effort made toward real selling, the inquiring buyer being lucky if he is accorded even a courteous reception. Until this attitude changes and until 1946 and 1947 model used cars are no longer quoted above factory list prices for the same cars, talk of the return of a buyers' market is just wishful thinking.

Pumps Outnumber All Other Machines in Use in U. S.

The most widely used machine in the United States is not the automobile, refrigerator or telephone, but the commonplace pump. According to an industrial report of Richard H. DeMott, vice president, SKF Industries Inc., there were more than 100 million pumps as compared with 34 million automobiles, 19,792,000 refrigerators and 27,800,000 telephones in use in this country at the end of 1946.



XTREME PRESSURE RELIEF VALVE?

Quiet Operation at Pressures up to 5000 psi

Accurate Maintenance of Pressure Setting

Instantaneous Action Preventing Objectionable Pressure Peaks

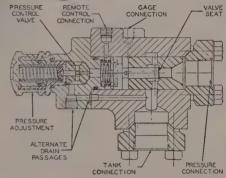
Pressure Adjustment from 50 psi to 5000 psi

Provision for Remote Control and Unloading

Perfect Hydraulic Balance

Zero Leakage

Rugged, Fool-Proof Construction



THIS NEW 5000 psi Relief Valve will put an end to the squeal and chatter problems in your hydraulic equipment.

No matter what your relief valve problems are, Superdraulic can help you. Send for data folder giving complete technical description.

Information on Superdraulic 5000 psi Pumps, Motors, Transmissions, Valves or Controls furnished on request.

Superdraulic Corporation

HYDRAULIC PUMPS • MOTORS • TRANSMISSIONS • VALVES
MILLER AT FORD ROAD • DEARBORN, MICHIGAN

Lone Star Steel May Get Plant For \$7,500,000

Purchase of blast furnace at Daingerfield, Tex., and coal mines at McAlester, Okla., from WAA pends

LONE STAR Steel Co. purchase of the 1200-ton capacity blast furnace and coke ovens at Daingerfield, Tex., and the coal mines at McAlester, Okla., from War Assets Administration for \$7,500,000 is expected to be completed by Mar. 24.

The company agrees to an initial payment of \$1 million to stretch over a period of one year beginning Mar. 8, 1947. It is to pay \$650,000 yearly for 10 years. George D. Ramsay will be named general manager of the operations at Daingerfield. The 78 coke ovens at the facility have been maintained at stand-by temperature, and it is reported that coke can be produced within the next week. The blast furnace is to be blown in not later than May 15.

It is stipulated that Sheffield Steel Corp., which had a bid in to lease or buy another government-owned, 700-ton blast furnace adjacent to its own plant in Houston, Tex., should have access to half the output of the Oklahoma mines so long as the pig iron emergency exists.

September Output for Housing

All pig iron to be produced at the Daingerfield plant is to be turned over to the government to be used for housing through September. During the last three months of the year one-third of the pig iron will go to domestic industry and two-thirds to housing. Lone Star had originally planned to sell one half its original production to Italy. There will be no restriction on 1948 output.

Spokesmen for Sheffield Steel, which also sought the Oklahoma mines and contended that there was an inadequate permanent market in the Texas area for the output of both blast furnaces, had not indicated whether it would continue negotiations for the Houston furnace. Sheffield had also maintained that the coal supply from the Oklahoma mines was inadequate for capacity operations of both plants.

Negotiations for the Daingerfield plant have been protracted with a previous Lone Star bid rejected as inadequate. The figure of \$7,500,000 which Lone Star Steel is now offering was the original government asking price. The



NEW MARINE ENGINE: The new Packard "Marine 8", featuring fingertip control reverse gear, is shown here. It is one of two new models of marine engines being shown by Packard at boat shows this spring

plant has a capacity for 450,000 tons of pig iron a year and, in addition, coke, ammonium sulphate, special oils, tar and other by-products.

Commercial Field Entered By Supplier to Navy

Arma Corp., Brooklyn, N. Y., which has produced precision instruments for the Navy for 28 years and employs several thousand men, entered the commercial field for the first time last week with the introduction of a new electronic gaging device at a preview showing in Cleveland. The new machine can inspect, sort and count up to 7000 parts per hour by using a hopper feed. According to Herbert C. Guterman, senior vice president and general manager, it is adaptable for use on production lines, receiving rooms and assembly departments.

Yale & Towne To Build New 16-Acre Factory Building

Yale & Towne Mfg. Co. will build a 16-acre, one-story factory and office building in Philadelphia to replace its present plant at 4530 Tacony St. To be built by Turner Construction Co., Phila-

delphia, the facility will house the firm Material Handling Division. More the 600,000 sq ft of the new plant, locate on a 93-acre site opposite Philadelphia Northeast Airport, will be devoted to ma ufacturing.

DuPont Production Facilitie Expanded Despite Shortage

Despite material shortages and other unusual conditions, construction costing \$92,300,000 was effected by E. I. d. Pont de Nemours & Co. in 1946. Production facilities received the bulk of the expansion, while extension of research activities had to be deferred in 1946.

Boley Heads Fine Wire Manufacturers Association

Ernest W. Boley of George W. Prenti & Co., Holyoke, Mass., was elected predent of the Fine & Specialty Wire Man facturers Association, Washington, at the organization's recent meeting. Other of ficers named were: Vice president, N. Melville, Pittsburgh Steel Co., Pittsburgh treasurer, W. E. Blecker, Page Steel Wire Division, American Chain & Cab Co., Monessen, Pa.

RIEFS...

Paragraph mentions of developments of interest and significance within the metalworking industry

Packard Motor Car Co., Detroit, has mounced that deliveries of two new pes of marine engines, originally scheded for January, will begin in April. he eight and six cylinder engines declop 150 and 100 hp respectively.

Goodyear Aircraft Corp., Akron, has achired the government-owned, \$900,000 at section of Plant B in Akron from Renstruction Finance Corp.

Despatch Oven Co., Minneapolis, has panded its national sales facilities by pointment of new territorial representives: John Wright for southern India, George W. McDaniel for northern diana, William T. Day for Pennsylnia and Delaware, DeWitt Gunsolus r Georgia, South Carolina and Florida, C. Matheson for northern California.

General Electric Co., Schenectady, N., has awarded 14 research fellowships talling \$20,500 to graduate students the fields of electricity, physics and dustrial management.

Kaiser-Frazer Corp., Willow Run, ich., has taken a five-year lease on the stroit plant of Continental Motors orp., Muskegon, Mich., whereby the to company will attempt to alleviate shortage of engines.

Shell Oil Co., New York, has appointed therican Chemsol Corp., Coraopolis, Pa., distributor for Shell's industrial solvets.

Rheem Rescarch Products Inc., Baltipre subsidiary of Rheem Mfg. Co., has nounced a new distributor-sales plan its corrosion resistant product. Rheem appointed distributors in all industrial

-0-

Wheelco Instruments Co., Chicago, ker of electronic instruments for measument and control of industrial proces, has arranged with Ether Ltd., Birngham, England, for the manufacture marketing of Wheelco products oughout the United Kingdom.

Precision Welder & Machine Co., Ginnati, manufacturer of resistance weld-machines, has appointed the follow-distributors: Hosler & Co., Indian-bis, for Indiana, Kentucky and Tennes; Machinery & Welder Co., St. Louis, Missouri, Illinois, Iowa and Wisconsin; Cunningham Equipment Co., Philaphia, for southern New Jersey and stern Pennsylvania; Canadian Fair-

banks, Morse Co. Ltd., Montreal, Canada, for all of Canada.

Bath Iron Works, Bath, Me., has acquired Pennsylvania Crusher Co., Philadelphia. Stanley Harshorn will be acting manager of the company, now to be called Pennsylvania Crusher Division.

R. G. LeTourneau Inc., Peoria, Ill., has begun production, in its recently completed \$5 million plant at Longview, Tex., of a housebuilding machine and a 180-horsepower bulldozer.

Skinner Chuck Co., New Britain, Conn., has purchased all physical assets of Allied Control Valve Co. Inc., South Norwalk, Conn. All personnel of the firm, now called Allied Control Valve Division, have been retained, and the division will continue to operate as a separate plant where it will manufacture standard and special stainless steel valves.

Beech Aircraft Corp., Wichita, Kans., sold \$2,740,000 worth of airplanes to foreign purchasers in 1946.

Luscombe Airplane Corp., Dallas, Tex., manufacturer of light planes, held a sales meeting recently which more than 400 dealers from all over the nation attended.

Bendix Home Appliances Inc., South Bend, Ind., sent an initial shipment of 40 washing machines to Russia recently, via Amtorg Trading Co.

-0-

Liquid Conditioning Corp., manufacturer of equipment for softening and clarification of water and other liquids, has moved its main office and plant to Linden, N. J.

J. I. Case Co., Racine, Wis., manufacturer of farm machinery, has purchased a 16-acre facility near Stockton, Calif. Property includes a warehouse and several buildings, and the Case company plans to build an additional assembly plant.

General Motors Corp., Detroit, has purchased from WAA a portion of the Allison Plant No. 3 in Indianapolis for \$550,000. Property is a one-story factory covering 126,000 sq ft of area. Original cost to the government was \$5 million

-0-

Sheffield Corp., Dayton, O., manufacturer of gages, instruments and machine

tools, has appointed Reasoner Tool & Supply Co., Boston, as gage and instrument representative in eastern Massachusetts, Maine, New Hampshire and Vermont. Richard S. Brown, Wilbraham, Mass., has been named machine tool representative for the same territory.

Bright Light Reflector Co. Inc., Bridgeport, Conn., and International Appliance Corp., New York, have been merged to form Bridgeport Pressed Steel Corp., with plants in Bridgeport. The new firm will manufacture lighting fixtures and electrical appliances.

Willys-Overland Motors Inc., Toledo, O., plans to reopen its assembly plant in Los Angeles. Used during the war for aircraft subassembly, the facility is now being re-equipped.

Toastmaster Products Division, Elgin, III., McGraw Electric Co., will open its 20,000-sq ft plant in Azusa, Calif., early in April.

Osborn Mfg. Co., Cleveland, has appointed West Coast Foundry Equipment Co., Los Angeles, as its sales representative for foundry molding machines and core blowing equipment.

Hagan Corp., Pittsburgh, combustion and chemical engineering firm, has purchased Ring-Balance Instrument Co., Chicago, manufacturer of industrial meters. Management and personnel of the Chicago firm will be retained.

Lincoln Electric Co., Cleveland, has honored 64 employees for length of service ranging from 10 to 30 years.

American Relay & Controls Inc., Chicago, manufacturer of electrical relays, switches and controls, has acquired all equipment and personal property of the Chicago Division of Allied Control Co. Inc. Personnel of the newly acquired division, numbering about 350, will be retained.

Black-Clawson Co., Hamilton, O., manufacturer of papermaking machinery, has purchased the Keuthan Foundry Co., Middletown, O. Personnel of the foundry will not be changed.

H. K. Porter Co. Inc., Pittsburgh, manufacturer of railway and oil field equipment, held its annual sales meeting recently.

Zinc Chemical Co. Inc., Baltimore, has been formed for the manufacture of zinc sulphate. Walter C. Bennett is president and G. M. Halsey is manager of the new company.

The Business Trend

Industrial Pace Moves To New Postwar High

INCREASED steel ingot production has helped industrial activity edge up to another new postwar high mark. This puts Steel's industrial production index for the week ended Mar. 8 at 161 per cent (preliminary) of the 1936-1939 average of 100, a one-point increase over the preceding week's revised figure of 160 per cent.

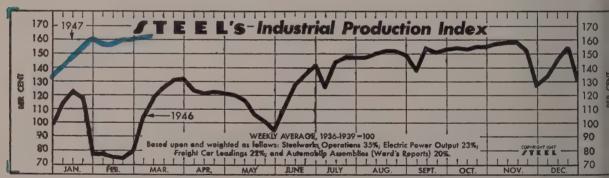
Other strong factors in the current high level of the index are automobile assemblies and electricity distribution, with railroad carloadings also figuring prominently. While the latter are considerably under the high levels of last fall they are well above those of this time last year. AUTOS—Output of automobiles is running above 100,000 a week but this level is being maintained only with considerable effort and above-normal costs as a result of continued unbalances in supplies of raw materials. Nevertheless, the industry is hopeful that the March output of U. S. and Canadian plants will rise to 451,825 passenger cars and trucks. Production in the week ended Mar. 8 was estimated at 104,437 passenger cars, trucks and busses, compared with the postwar high mark of 105,175 in the week ended Mar. 1.

ELECTRICITY—High-level industrial operations have been principally responsible for a 19 per cent increase in electricity consumption in the first ten weeks of this year over the corresponding period of 1946. In each of those weeks of 1947 the consumption has exceeded that of the like week a year ago.

RAILROADS—In operating at high rate, industry had needed considerably more freight transportation than did a year ago. In the first nine weeks of 1947 total raroad freight car loadings have exceeded those of the corresponding period of last year by 10 per cent, with loadings in each of those weeks of 1947 surpassing those of the corresponding week in 1946. Despite this increase traffic, the net income of class 1 railroads in Janual 1947, was only an estimated \$29 million, compared with \$33,887,227 in January, 1946.

TRUCK LOADINGS—Also benefiting from the rising lever of industrial activity were motor carriers, their freign tonnage in January going 0.3 per cent above that December and 19.5 per cent over that of January, 194 Iron and steel comprised about 3 per cent of the tofreight tonnage hauled by trucks in January, when traff volume of iron and steel carriers was 4 per cent of December and 54.4 per cent above January, 1946, the American Trucking Associations Inc. reported.

PRICES—Reflecting the continued upward spiralling prices, the U. S. Bureau of Labor Statistics wholest commodity price index in the week ended Mar. 1 jump 1.5 per cent over that of the preceding week. This put the index up to 146.4 per cent of the 1926 average of 10 the highest level since late 1920, although still 12 p cent below the all-time peak in May, 1920. Compar with a year ago, the current level of the index is up 36 per cent.



The Index (see chart above):

Latest Week (preliminary) 161

Previous Week 160

Month Ago 153

Year Ago

FIGURES THIS WEEK

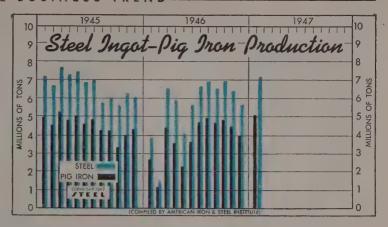
INDUSTRY	Latest Period*	Prior Week	Month Ago	Y A
Steel Ingot Output (per cent of capacity)	93.0	92.5	92.0	7
Electric Power Distributed (million kilowatt hours)	4.787	4,797	4,801	3.
Bituminous Coal Production (daily av.—1000 tons)	2.145	2,172	2,296	2,
Petroleum Production (daily av.—1000 bbls)	4,824	4,771	4,770	4,
Construction Volume (ENR—Unit \$1,000,000)	\$127.9	\$91.7	\$111.5	4, \$6
Automobile and Truck Output (Ward's—number units)	104,437	105,175	89,958	23,
^o Dates on request. †1947 weekly capacity is 1,749,928 net tons. 1946 we	ekly capacity	was 1,762,381	net tons.	

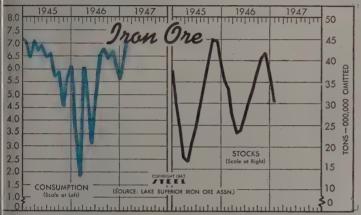
TRADE

ADL				
Freight Carloadings (unit—1000 cars)	850†	850	767	78
Business Failures (Dun & Bradstreet, number)	58	74	45	9
Money in Circulation (in millions of dollars)	\$28,335	\$28,262	\$28,295	\$27,95
Department Store Sales (change from like week a year ago)	+10%	+2%	+10%	41,00
+ Preliminary + Federal Passage Board	, =0,0	1 4470	1 2070	1 -

Iron, Steel Production

(Net Tons-000 omitted)							
	-Steel Ing	ots	-Pig	Iron-			
194	7 1946	1945	1947	1946			
7,23	4 3,872	7,204	5,071	2,645			
	. 1,893	6,653		1,148			
	. 6,507	7,706		4,424			
	. 5,860	7,290		3,614			
	. 4,072	7,450		2,275			
	. 5,625	6,841		3,682			
	. 6,610	6,986		4.705			
	. 6,887	5,735		4,898			
		5,982		4,687			
		5,597		4,815			
		6,200		4,435			
	. 5,701	6,058		3,992			
_							
	. 66,364	79,702		45,379*			





Iron Ore (Lake Superior Iron Ore Assn.) Gross tons-000 omitted

			Stocks at		
			Lake Er	ie Docks	
-	Consu	mption	and fu	rnaces	
	1947	1946	1947	1946	
Jan	7,024	3,719	30,514	35,342	
Feb		1,748		33,647	
Mar		6,021		27,601	
Apr		4,769		23,079	
May		2,990		23,905	
June		4,995		26,265	
July		6,460		30,439	
Aug		6,738		34,067	
Sept		6,380		37,573	
Oct		6,625		40,435	
Nov		6,131		41,919	
Dec		5,516		37,465	
Total		62,093			

1	Foundr	У			
Equi	pment (Orders	G	ear Sa	les
	-Index-			-Index	
(1937-	-38-39=	:100)	(19	28=1	(00)
1947	1946	1945	1947	1946	1945
513.4	392.8	422.4	350	269	323
	432.8	465.3		253	331
	536.6	604.7	١	275	339
	701.2	825.0		284	296
	577.3	404.7		313	809
	491.7	375.4		321	271
	453.4	411.7		407	264
	538.7	532.2	4,4.4	368	205
	424.4	577.2		342	213
	469.2	457.8		397	251
	477.4	416.6		836	255
	430.9	547.6		425	239
	493.9	461.7		332	275



The Party of the P	Bank Clearings (Dun & Bradstreet—millions) Federal Gross Debt (billions) Bond Volume, NYSE (millions) Stocks Sales, NYSE (thousands). Loans and Investments (billions)† United States Gov't. Obligations Held (millions)† † Member banks, Federal Reserve System.	\$260.7 \$19.9 5.321	Prior Week \$11,370 \$261.5 \$18.3 5,377 \$55.1 \$34,949	Month Ago \$13,276 \$259.1 \$27.9 7,908 \$55.8 \$35,636	Year Ago \$12,023 \$278.7 \$24.5 5,226 \$68.1 \$49,518	
The residence of the last	ICES STEEL's composite finished steel price average All Commodities† Industrial Raw Materials† Manufactured Products† † Bureau of Labor Statistics Index, 1928=100.	146.4	\$69.73 144.3 156.2 140.0	\$69.36 140.3 152.6 135.6	\$63.54 107.6 119.5 103.7	

Men of Industry



LESTER J. HENDERSON

Lester J. Henderson, formerly assistant general sales manager, Weatherhead Co., Cleveland, has been appointed general sales manager of the Aeroquip Corp., Jackson, Mich.

William M. Hillborn, Cribben & Sexton Co., Chicago, has been elected president of the company, succeeding George D. Wilkinson Sr., who retains the position of chairman of the board. Thomas H. Heneage has been elected vice chairman of the board, and Sidney R. Hill has been named controller. George D, Wilkinson Jr., secretary of the company, has been made a member of the board of directors. Wendell C. Davis has been re-elected vice president and treasurer. W. C. Wilkinson has been appointed purchasing agent of the company to succeed Carl E. Lyon, who retired some months ago.

Col. Harry L. Berno has been appointed chief of the industry branch, Economics Division, Office of Military Government for Germany (U. S.) Before entering military service in 1942, he had been president of W. H. Davey Steel Co., Cleveland.

D. S. Harder has resigned as chairman of the board and director of the E. W. Bliss Co., Detroit, because of complete occupation with his duties as vice president in charge of operations for the Ford Motor Co., Detroit.

George H. Halbert has been named general attorney of Rheem Mfg. Co., New York. He succeeds J. Harold Merrick, resigned.

Robert L. Schroy has been appointed to direct sales activities of Columbia Rubber Co., Ravenna, O., a division of the U. S. Stoneware Co. He was formerly



JOHN A. CUNEO

associated with the Firestone Tire & Rubber Co., Akron.

William P. Barrett, General Electric Co., Detroit, has been appointed representative for the company's Conduit Products Division in the Cleveland area.

John A. Cuneo, Fairbanks, Morse & Co., Chicago, has been appointed manager of the company's branch in Los Angeles to succeed Harry W. Brown, who has retired.

W. T. Stratton has been appointed director of purchases, Wickwire Spencer Steel Division, New York, Colorado Fuel & Iron Corp. He will be located at Buffalo. Mr. Stratton succeeds E. A. Johnston, resigned.

G. J. Brenner has been appointed representative of the Tungar & Metallic Rectifier Division, General Electric Co. He will cover the northwest territory. He had previously been in the Bridgeport, Conn., office of the rectifier division.

Cornelius C. Felton, Revere Copper & Brass Inc., New York, has been named to head the Manhattan metals and machinery section of the Red Cross 1947 Fund of Greater New York. Assisting Mr. Felton are F. Loyal Gammon, Carnegie Steel Corp., as chairman of the steel and iron companies group, and A. G. Pratt, Babcock & Wilcox Co., New York, as head of the general machinery and ordnance group.

Robert W. Ferrell, formerly counsel for the Electronics Department, General Electric Co., Schenectady, N. Y., has been appointed manager of employee and community relations of the Affiliat-



J. G. BOLLINGER

ed Mfg. Companies Department of General Electric.

W. J. Gleason has been appointed export sales manager for the Kaiser Co Inc., Iron and Steel Division, Fontana Calif.

J. G. Bollinger has been appointed district sales manager of Air Reduction Sales Co., New York, Harold P. Etter sales manager, Pacific Coast Division announced last week. In his new capacity, Mr. Bollinger will report to Haw. Saunders, manager, San Francisco district, with headquarters at Emery ville, Calif.

T. C. Rademacher Jr., Young Radiato Co., Racine, Wis., has been appointed advertising and sales promotion manage of the company. He was formerly as sistant merchandising manager of the Massey-Harris Co., Racine.

Kenneth L. Walker has been appointed vice president in charge of production Kalamazoo Stove & Furnace Co., Kalamazoo, Mich. Since 1940, Mr. Walker had been head of his own company in Detroit, known as Walker & Associated consulting engineers.

Dr. George H. Spencer-Strong has bee elected a vice president of the Pemo Corp., Baltimore. He was formerly de rector of research for the company.

Joseph G. Holzschuh has been appoined sales engineer covering the Pittsburg territory for the E. W. Bliss Co., Detroit.

Charles A. Thomas, vice president and technical director of Monsanto Chemica Co., St. Louis, has been named as the second recipient of the Industrial Records.



here is .001 Stainless Steel!

One of Armco's war-born developments is chromium-nickel stainless steel strip as thin as .001 — rolled in coils up to 13 inches wide!

This makes possible many improved products for home and industry. Uses are diversified—from thermostat diaphragms to flexible metal hose, weather-stripping and pen points; from heddles and drop wires in textile looms to shim stock.

Armco's tissue-thin stainless steel is rolled to a remarkable gageuniformity. And with it you get excellent corrosion resistance, a high strength/weight ratio, and attractive appearance. To your production line it brings all the cost-saving advantages of coils—no hand-feeding, relatively no end-of-strip scrap losses, less die-wear and faster production.

no end-of-strip scrap losses, less die-wear and faster production.

Write for data on Armco Thin-Gage Stainless Steels for your specific products. We'll be glad to supply you with the information you need. (If your requirements run to stainless steel bar stock remember many grades of Armco Stainless Steel bars are available for immediate delivery.)

The American Rolling Mill Company, 1021 Curtis Street, Middletown, Ohio.

HE AMERICAN ROLLING MILL COMPANY



search Institute Medal, given for an outstanding contribution to the field of industrial research by the Industrial Research Institute Inc., New York.

--0-

Werner G. Smith Co., Cleveland, has moved its Chicago district office from 520 N. Michigan Ave. to 1608 N. Milwaukee Ave., Chicago 47, and at the same time enlarged its sales staff. J. C. Gore, who continues as the company's Chicago manager, is now assisted by C. E. Coulter and William C. Kremer.

Bendix Home Appliances Inc., South Bend, Ind., has appointed three new members to its staff: Wayne H. Hollett has been named service training coordinator; Donald H. Scott, service supervisor for Canada, and Kenneth H. Teeter, service specialist on the Bendix automatic home ironer.

Michael J. Batenburg, Pittsburgh Plate Glass Co., Pittsburgh, has been appointed manager of paint advertising for the company to succeed the late Edward J. Allee.

---0-

George R. Lundberg has been appointed personnel manager, Osborn Mfg. Co., Cleveland. He succeeds T. W. Spoeri who resigned recently. Mr. Lundberg will be in charge of personnel activities of both the company's machine and brush divisions.

Sidney A. Lewis, former captain in the U. S. Army Chemical Warfare Service, has joined the U. S. Stoneware Co.'s Process Equipment Division's sales engineer force, Akron. He will have his headquarters in New York.

---O--

W. A. Sicha, Aluminum Co. of America, Cleveland branch, has been named vice chairman of the Aluminum & Magnesium Research Committee of the American Foundrymen's Association.

W. F. Rockwell Jr., Rockwell Mfg. Co., Pittsburgh, has been elected president of the company. He was formerly vice president and general manager. Col. Willard F. Rockwell, who has been both president and board chairman, will retain the office of chairman of the board.

Ralph N. Long has been appointed assistant comptroller of General Motors Corp., Detroit. He will be in charge of the Insurance Section.

H. W. Cobb has been appointed office manager of the Cleveland warehouse of Norton Co., Worcester, Mass. He will succeed E. D. Linton, former Cleveland office manager, who returns to Worcester to join the staff of the company's merchandising engineer. R. V. Bergstrom has been appointed abrasive engineer in the Cleveland area to succeed Mr. Cobb. E. J. Lalor has been appointed abrasive engineer in the Erie, Pa., territory to succeed J. L. Moser.

The Burdett Oxygen Co., Cleveland, has announced several new appointments for its subsidiary, California Air Products, Los Angeles: Jack Bernstein has been appointed manager of operations; William Young will be in charge of the construction of the acetylene plant in Los Angeles; Winfield Rice has been appointed superintendent of the oxygen plant.

E. Labadie, Process Engineering Department, Progressive Welder Co., Detroit, has been promoted to service manager.

Ford R. Snyder has joined Hickman, Williams & Co., Chicago, as metallurgist.

Ellwood G. Peterson, formerly vice president and general manager, Hannifin Corp., Chicago, has been elected president; Mark R. Gault, controller, has been elected secretary, and vice presidents Harry H. Adams, Otto J. Maha and Clarence B. Mitchell have been reelected.

Youngstown Sheet & Tube Co., Youngstown, has announced the following promotions in its organization: W. H. Yeckley, general superintendent of the Brier Hill Works, has been appointed general superintendent of the Campbell Works steel plant, blast furnaces and Struthers works. He succeeds Buford M. Stubblefield who recently was named Chicago district manager. D. W. Lloyd, superintendent of the Brier Hill bloom

W. H. YECKLEY

and round mills, succeeds Mr. Yeckleyi Melvin Shaulis has been named superintendent of the mills. Graham B. Brown has been appointed assistant superintendent of the Campbell hot mills seamless tube department.

Bridgman Castings Inc., Bridgman, Mich., subsidiary of the Hannifin Corp., has announced that Harry E. Davies, formerly a Hannifin factory manager, has been named manager at Bridgman and has been elected a vice president.

William Wilson Jr., formerly general superintendent, Eclipse-Pioneer Division, Teterboro, N. J., of Bendix Aviation Corp., has been appointed president of a newly formed company, the American Light Alloys Inc., 1265 McBride Ave., Little Falls, N. J., which specializes in production of aluminum and magnesium sand castings. A. L. Faulconer, also formerly associated with Eclipse-Pioneer, has been named sales manager of the company.

John A. Malloy has joined the sales organization of the Hill-Chase Steel Co., Baltimore.

__0__

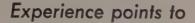
Harold F. Bower, Waldes Kohinoor Inc., Long Island City, N. Y., has been appointed sales manager, Truarc Retaining Rings Division.

Harold J. Rennpage has been appointed assistant to the field service manager, Twin Coach Co., Kent, O.

David E. Lukens, Philadelphia Tube Co., Philadelphia, has been appointed general manager of the company. Formerly sales engineer of the Summerill Tubing Co., Bridgeport, Pa., he will con-



D. W. LLOYD



Bliss for rolling mills

Hundreds of outstanding Bliss sheet and strip mill installations—here and abroad—give daily evidence of the close cooperation between customer and builder which alone can create a mill exactly suited to the job at hand.

Whether your requirements concern 2, 3, 4-high or cluster mills; hot- or cold-rolling of ferrous or non-ferrous metals, Bliss can supply the equipment specially designed to suit your needs. In addition, Bliss builds an extensive variety of accessories: mandrel type hot mill coilers, upcoilers, slitters, reels, etc.

Call on Bliss for the best in rolling mill machinery. Your inquiry will receive prompt attention and constructive follow-through.

E. W. BLISS COMPANY Rolling Mill Division Salem, Ohio

ROLLING MILLS, MECHANICAL AND HYDRÄULIC PRESSES, CAN AND CONTAINER MACHINERY



tinue as engineering representative for the Autogiro Co. of America, Philadelphia, in addition to his new appointment.

Brig. Gen. James Creel Marshall, who in 1942 organized the Manhattan Engineering district, charged with development of the atom bomb, has been retained on the engineering staff of M. W. Kellogg Co., New York.

George F. Heath has been appointed St. Louis district sales representative, the Cleveland Worm & Gear Co. and the Farval Corp., Cleveland.

J. R. Esposito has been elected a vice president of Interchemical Corp., New York. J. G. Morris, formerly executive vice president of the Finishes Division of Interchemical, succeeds Mr. Esposito as president of that division.

Ralph D. Holcomb has been appointed general sales manager of Harnischfeger Corp., Milwaukee.

A. M. Finley has been appointed development manager of Goodyear Tire & Rubber Co.'s mechanical goods plant in Lincon, Nebr.

Emmett A. Williams, American Brake Shoe Co., New York, has been appointed vice president in charge of operations of the National Bearing Division. I. E. Cox has been appointed vice president in charge of engineering for the division.

Edmond J. McSweeney has been elected vice president in charge of manufacturing, the Hydraulic Press Mfg. Co., Mt. Gilead, O. He succeeds R. J. Whiting, who has resigned.

W. W. Dalton has been named to head a newly created sales division—the Household Appliance Sales Division—for the Lord Mfg. Co., Erie, Pa.

William Clark, General Industrial Sales Inc., has been elected president of the Racine chapter of the American Society of Tool Engineers. Other officers named for this year are William Reinhardt Jr., first vice president; Charles Moran, second vice president; George Christiansen, treasurer; and Edwin B. Christiansen, secretary.

John R. McGuire, Waterman Engineering Co., Evanston, Ill., has been appointed sales manager of the company.

Ralph E. Burgess, acting director of the government finance department, National Association of Manufacturers, has resigned to form his own business as industrial consultant.

Earl H. Bodinson has joined the sales staff of Hammond Iron Works, Warren, Pa., and Port Neches, Tex. He will have his headquarters in the New York office where he will assist the vice president in charge of sales.

H. J. Fraser and H. J. French have been elected as additional vice presidents of the International Nickel Co. Inc., New York. Mr. Fraser has been assistant vice president. Both he and Mr. French are assistant vice presidents of the International Nickel Co. of Canada Ltd., the parent company.

W. W. Hicks has been appointed to the sales and service department of Northern Equipment Co., Erie, Pa.

John O. Tragard, Fulton Sylphon Co., Knoxville, Tenn., has been appointed sales manager of the eastern territory of the company.

Clarence M. Smith, Optimus Detergents Co., Matawan, N. J., has been appointed field service representative for central Pennsylvania.

Charles S. Redding, president of Leeds & Northrup Co., Philadelphia, has received the honorary degree of Doctor of Science from the University of Pennsylvania.

The Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of U. S. Steel Corp., has announced consolidation of its Metallurgical Division. In order to assist Edward T. Barron, chief metallurgical engineer of the company, in administering the streamlined division, Louis J. Rohl, district metallurgical manager in



LOUIS J. ROHL

Chicago, has been promoted to assistant chief metallurgical engineer at the Pittsburgh office.

E. O. Dixon of the Ladish Drop Forge Co., Cudahy, Wis., has been appointed a member of the National Metals Handbook Committee of the American Society for Metals.

Herman Wagen has been appointed a district sales manager for the Heil Co., Milwaukee, He will cover the territory including Wisconsin, Michigan, Illinois, Indiana, Ohio and Kentucky, and will have his headquarters at Milwaukee. Mr. Wagen has been sales representative for Heil truck bodies and hoists in this area for several years and will continue to handle distributor contacts on these units. Tom Boyle has been transferred from the company's district office at Kansas City, Mo., to the Milwaukee district office, where he will concentrate on distributor sales of milk and petroleum storage and transport tanks.

L. P. Robinson, director of core oil sales of the Werner G. Smith Co., Cleveland, will address a meeting of the Wisconsin chapter of the American Foundrymen's Association.

Melville Irwin has been appointed treasurer of Air Markings Inc., Boston. This is a new company which is located at 79 Milk Street, Boston 9, and which designs and constructs large markers as aids to aerial navigation. Mr. Irwin was formerly associated with the Wellman Engineering Co., Cleveland.

L. F. Holfelder has been appointed factory representative of the Brush Division, Osborn Mfg. Co., Cleveland. He will make his headquarters in Cincinnati and will cover the Cincinnati, Louisville and Nashville areas.

E. W. Heffernan has been appointed manager of the newly established sales and service office in Philadelphia, Wheelco Instruments Co., Chicago.

S. E. Eades, traffic manager of the Douglas Aircraft Co. Inc., Santa Monica, Calif., has been elected general chairman of the Aircraft Industries Association, Western Regional Traffic Committee. Leo A. Carter, for 16 years a member of the engineering and manufacturing divisions of Douglas Aircraft, has been appointed manager of the parent plant at Santa Monica. He succeeds G. A. Huggins, who is on extended leave of absence.

Henry S. Geismer, formerly assistant chief engineer for Tennessee Coal, Iron

Railroad Co., Birmingham, subsidiary f U. S. Steel, is opening a consulting agineering office in Birmingham.

George W. Scully has been appointed vire and cable representative in the tlantic district for the General Electric to., Schenectady, N. Y.

E. E. Smith, formerly manager of ales at Tulsa, Okla., has been made anager of sales at Houston for the lational Tube Co., Pittsburgh, a subdiary of United States Steel Corp. He acceeds Forrest A. Marsh, who has been popointed vice president in charge of ales. Mr. Marsh succeeds James B. Traham, who is retiring. Mr. Graham as been associated with National Tube ince 1905.

Frank X. Campbell has been appointed eneral service manager of TelAutograph orp., New York. He has been assolated with the corporation for the past 0 years. Samuel Spilka has been proted to assistant treasurer and Bruna avan to assistant secretary of the corporation.

Henry G. Mahoney has been named anager of purchasing in the Lighting ixture Division, Sylvania Electric Products Inc., New York. He joined Sylvania 1943 as assistant purchasing agent in the Appliance Division.

Horace H. Silliman has been appointed anager of distribution of the Radio vivision, Bendix Aviation Corp., Detroit.

Malcolm Monroe, son of the founder Monroe Calculating Machine Co.,



NEELE E. STEARNS Appointed assistant general manager of sales, Inland Steel Co., Chicago. Noted in Steel, Mar. 10 issue, p. 86

Orange, N. J., has been elected assistant secretary. Mr. Monroe has been a director of the firm since 1938.

John E. Foster has been elected a vice president of George Fry & Associates, consulting management engineers. Mr. Foster will be eastern manager for the firm.

Richard B. Tucker has been elected executive vice president of the Pittsburgh Plate Glass Co., Pittsburgh. Donald C. Burnham and John A. Wilson have been elected vice presidents of the company. The vice presidencies to which Mr. Burnham and Mr. Wilson have been elected are new positions. As executive vice president, Mr. Tucker will represent the Glass Manufacturing Division on the board of directors and will have general



ALVIN L. KRIEG
Appointed assistant to the general manager,
National Machine Tool Builders' Association,
Cleveland. Noted in Steel, Mar. 10, p. 87

direction of most of the company's foreign activities. Mr. Burnham will be in charge of the Merchandising Division and all glass sales, and Mr. Wilson will be the operating head of the Glass Manufacturing Division.

Chris J. Jensen Sr, has been appointed foreign representative and engineer for the Perfex Corp., Milwaukee. He will make his headquarters in Oslo, Norway, working with European manufacturing accounts and the Perfex exporting agent, in educational programs.

Dr. Vladimir K. Zworykin has been elected vice president and technical consultant of the RCA Laboratories Division, Radio Corp. of America, New York. He has been director of electronics research for the division since 1930.

DBITUARIES . . .

Edward F. Entwisle, 64, general manger of the Lackawanna, N. Y., plant of the Bethlehem Steel Co., died at his tome in Buffalo, Mar. 8. Mr. Entwisle and been associated with the steel instry for 40 years, beginning with the arnegie Steel Co., at Duquesne, Pa., in 207. He had been a director of the Asciated Industries of New York. He as a member of the American Iron & ceel Institute.

Carlos W. Van Law, 73, mining engier with the Vanadium Corp. of Amera, New York, and vice president of its ibsidiary, Rhodesian Vanadium Corp., ed recently at his home in Pelham, . Y.

Charles O. Cozzens, 57, president of e American Optical Co., Southbridge, ass., died recently. He had been interested in the field of industrial safety, and under his inspiration, American Optical Co. developed many new and improved safety products specifically designed to safeguard industrial workers.

Ralph J. Andrews, 59, vice president in charge of research of the Wilson Carbon Co., New York, died on Mar. 3 while on a business trip to Aruba in the Netherlands West Indies.

John H. H. Alden, 71, retired purchasing agent, Geometric Tool Co., New Haven, Conn., died Mar. 9.

George L. Cornwall, 86, formerly consulting engineer to the Burnham Boiler Corp., Elizabeth, N. J., died at his home in that city after a long illness.

Manley H. Simmons, 83, founder and retired president, Enameled Steel & Sign Co., Chicago, died Mar. 9 in Evanston, Ill. He founded the company in 1901 and served as its head until a year ago.

William L. O'Neill, 65, who retired in 1931 as first vice president, Bendix Aviation Corp., died Mar. 6 in San Francisco. He was president of the Stromberg Carburetor Co. before it was acquired by Bendix in 1929.

James W. Atkinson, 64, sales representative of the Detroit branch, Reliance Steel Division, Detroit Steel Corp., Detroit, died recently.

Adolph G. Munz, 52, secretary-treasurer, A. C. Engineering Co., Milwaukee, died Mar. 5. He formerly had been associated with the Monarch Tool & Die Co., Milwaukee.

Michael A. Eiben, 56, president of the Northern Blower Co., Cleveland, died in California, on Mar. 11.

Photographic Studies Contribute to

BETTER MACHINING METHODS

Mechanism of metal cutting, captured by the camera's eye, provides documentary evidence—not otherwise apparent to the human eye—of need for changes in metal structure, tooling, and even in machine tools themselves. "Stopped" action techniques described here are practical and yield much information that can be gained in no other manner

PHOTOGRAPHY plays a prominent part in the steady advancement of the metal cutting process from art to science. It contributed and is still contributing much in the development of the machine tool itself.

In the course of the metal cutting research conducted by Cincinnati Milling Machine Co. over the past 20 years, a prodigious number of photographic records were made using many special cameras and special techniques. Careful scrutiny of these records revealed details that could not otherwise have been observed during the actual experiments in the cutting of metals, or in the operation of the machine. Many theories concerning the mechanism of the metal cutting process were proved or discarded on the basis of what was recorded through the lens of a camera.

Chip photomicrographs play a prominent role in metal cutting research. They are useful in many ways. A typical example of one of these is Fig. 1. This shows a section through a chip in a plane perpendicular to the cutting edge of a tool. It shows a portion of the chip as

Fig. 1—Photomicrograph illustrating geometry of chip formation when cutting with positive rake angle tool, Sintered carbide tool, rake angle equals 10 degrees. (X100—reduced to about 0.4 linear in reproduction)

Fig. 2—Three basic chip types according to Ernst:Type 1, discontinuous or segmental chip; type 2 continuous chip without builtup edge; type 3 continuous chip with builtup edge.

(X100-reduced to about 0.4 linear)

Fig. 3—Photomicrograph of type 2 chip, showing how a continuous chip is formed by a process of shear. Note lack of evidence of any splitting action occurring just ahead of cutting tool on left side of picture. Sintered carbide tool, negative 10-degree rake. (X500-reduced to about 0.7 linear) Fig. 4—Photomicrographs of etched samples of four specimens of cast iron. (X750—reduced to about 0.7 linear)

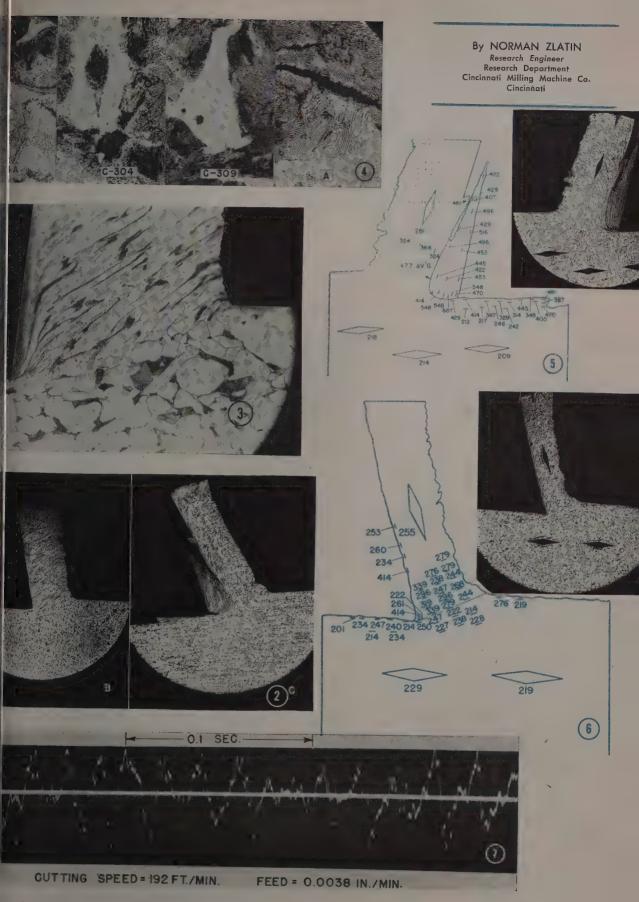
Fig. 5—Hardness distribution in type 3 broaching chip from SAE 1112 steel. Cutting speed 40 ft per min., rake angle plus 15 degrees, high-speed tool. (X100 reduced to cheef 0.4 linear)

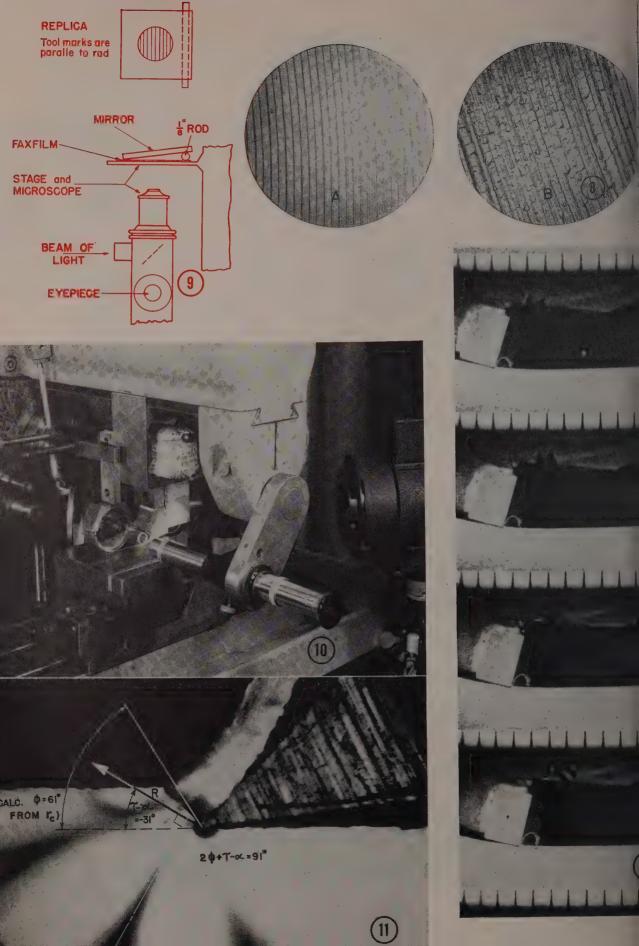
tool. (X100—reduced to about 0.4 linear)
Fig. 6—Type 2 milling chip from SAE 1112 steel.
Cutting speed 780 ft per min., rake angle plus
10 degrees, sintered carbide tool. (X100—reduced to about 0.4 linear)

Fig. 7—Oscillograms of forced oscillations resulting from two different cutting operations













is being formed during the cutting process. While his might appear to be a picture representing only a laning type of cut, actually it is identical with photo-icrographs of sections perpendicular to the cutting edge any type of metal cutting operation. Incidentally, get this picture of the chip as it actually existed during the cutting process, the cutting action was stopped almost estantaneously. Chips shown in all of the photomicro-aphs in this article were obtained by employing a special chinque involving the shear pin method of quick-opping.^{1, 2}

Theory relating the quality of surface finish of the orkpiece to mechanism of chip formation was verified rough this use of photomicrography. Photographs of the kind shown in Fig. 2 confirm this relationship. Here e shown the three classified types of chip formations. It chips, regardless of cutting process, must fall into the of these three classes. Notice the type 3 chip. It an excellent illustration of how a rough work surface

results when fragments of the builtup edge pass off the finished surface (the surface to the left of the chip). Contrast the quality of this surface with that generated during a cutting process in which a type 2 chip is formed. It is then evident that we must have a machine tool on which we can select such a combination of speeds, feeds and cutting fluids to produce the type of chip which will give the best surface finish.

Careful study of the cutting process coupled with the aid of photomicrographs of the chips also revealed the correlation between the type of chip and the efficiency of metal removal. It was found that in the case of ductile materials this efficiency is highest with the type 2 chip and lowest with the type 3. If the workpiece is brittle the efficiency may also be high for the type 1 chip.

Photomicrographs aided considerably in settling many controversial theories of the metal cutting process. A photomicrograph, such as Fig. 3, of a section taken through a partially removed chip is a case in point. Such a picture quickly dispels the idea that the tool acts as a wedge in the cutting process. Note that there is no splitting action just ahead of the tool nose.

The same photomicrograph also presents strong evidence in favor of two ideas; (1) a continuous chip is formed by a process of shear; (2) the plastic flow of the metal occurring in the process takes place essentially in a plane. This plane extends from the cutting edge of A to the corner between the chip and unmachined work surface at B. The sharp line of demarcation between the deformed and the undeformed (*Please turn to Page* 131)



Fig. 8—Faxfilm pictures of surface finish of two different metals, (Illustration reduced to about 0.6 linear in reproduction)

Fig. 9-Setup for photographing Faxfilm replicas

Fig. 10—Setup used in photoelectric analysis of stress distribution when cutting celluloid

Fig. 11-Photoelectric analysis of celluloid cutting

Fig. 12—Pictures taken at rate of 3000 frames per sec, showing action of cutting tool. Cutting speed in excess of 400 ft per min

Fig. 13—Photoflash view of high speed cutting of cast iron, Large corner carbide cutter. Note curling chip

Fig. 14-X-ray diffraction picture of cold rolled aluminum plate

Fig. 15-X-ray diffraction picture of aluminum plate of Fig. 14 after annealing

Selection and Application of



MECHANICAL
FINISHES
ADE
HLUMINUM

By RALPH E. PETTIT

Development Division Engineer Aluminum Co. of America Pittsburgh



Grinding, buffing, polishing, scratch brushing, ball burnishing, sand blasting and other mechanical finishing methods now are commonly used as surface preparation for subsequent chemical, electrochemical, or organic coatings and sometimes simply for decorative purposes

MUCH of the information concerning decorative finishes or aluminum was evolved during the wartime search for rotective coatings which would withstand the rigors of attreme service on the battlefield and in other unusual arroundings. Out of such research came new surface eatments and methods of application which have succeeded in lowering costs as well as improving quality.

The mechanical finishes for aluminum add nothing to the rotective coating of the metal but do allow for disnetive appearance and performance. Because of alumium's physical properties, there are some differences in a practices followed in applying mechanical finishes, though the techniques are similar to methods of obining comparable finishes on other metals. For example, were wheel speed and finer abrasives are required, because aluminum and its alloys are somewhat softer than any of the other commonly used metals. Furthermore, uminum's high coefficient of friction causes enough eneration of heat during certain operations to emphasize importance of proper lubrication.

Naturally, the ability of the operator is of paramount aportance, as many hand finishing operations are inspensable despite the extensive use of automatic fining machines. This is particularly true for touch-up ork and for finishing articles of irregular shapes. Proper additions and equipment will produce quality and unimity in appearance only when correctly and skillfully

A variety of finishes may be applied to aluminum by echanical means. One such finish is produced by a ries of operations commonly classified as grinding, dishing, buffing and coloring. Generally, the operan is further subdivided into roughing and oiling. Since e sequence of operation for applying any given meanical finish to aluminum is essentially the same reurdless of product involved, consideration of practices tall types of aluminum products is not necessary for

3)

an understanding of the general principles involved.

The preliminaries in polishing uneven or deeply scratched surfaces is a coarse polishing or roughing operation. Sand castings always receive this treatment, which is generally accomplished with a smooth wheel faced with 60 to 100 mesh emery. In some instances 60 to 120 mesh aluminum oxide is preferred for facing the wheel. Varying in diameter from 12 to 20 in., the wheel should operate at a peripheral speed of about 6000 fpm. An acceptable lubricant, such as tallow, should be applied to reduce heating.

Plain flat work lends itself to roughing by means of abrasive belts. The belts should be set up with 80, 120, 140, and 180 grit and may be lubricated with tallow and machine oil, or with a thin paste of paraffin and turpentine. In some cases roughing operations are accomplished, without lubricants, by using silicon carbide No. 80 on flexible paper wheels.

The secondary polishing operation, known as oiling, differs from roughing in that finer abrasives and softer wheels are employed. Felt wheels faced with 100 to 160 mesh abrasive (generally emery), and sufficient lubricant, are customary.

The buffing operation, which follows polishing, produces a lustrous finish. Either loose or stitched muslin wheels may be used with paper or wood separators, as dictated by the character of the work.

Unlike the practice in polishing, the abrasive used in buffing is applied to the revolving cutting face of the wheel from a stick, or cake, held against the surface. The most common cutting materials are tripoli, silica, or a mixture of tripoli and silica, held together with a grease binder or a water soluble material. The diameter and face of buffing wheels will vary greatly, depending upon the size and shape of the work being done. Normal operating wheel speeds should range between 7000 to 7500 fpm.

Coloring, the final operation in this finishing procedure, imparts a characteristic silver-white color and high luster to the surface of the metal. No metal is removed by this operation. Usually, coloring is done with open muslin or canton flannel wheels, employing Vienna lime, or white

Fig. 1—Finer abrasives and softer wheels are used in secondary polishing operation known as oiling

Fig. 2—Wire brush or scratch brush finish will break up large areas of flat surfaces. Finer wire will impart the coft, smooth sheen known as satin finish

Fig. 3—An aluminum stew pan is polished by holding it against a spinning felt wheel

silica in brick or cake form, as the abrasive. Wheel speed should be from 7500 to 8000 fpm.

To establish hard and fast rules governing buffing sequence would be of little value, inasmuch as the desired finish, the condition of the surface, the skill of the operator, and the shape of the part all influence the operation. As a general rule, sand castings are finished with a 4-wheel sequence-roughing, greasing, buffing, and coloring. Diecastings, on the other hand, may require a 2, 3, or 4wheel sequence, depending upon the desired finish and initial condition of the surface.

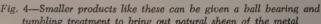
Screw machine products are sometimes given the greasing, buffing, and the coloring treatment, although greasing is usually eliminated. Frequently, however, screw machine products are finished by tumbling, or left unfinished. Wrought products, principally sheet, are as a rule merely buffed and colored. Forgings, tubing, and extrusions may also be satisfactorily finished in this manner if surface conditions permit. It is desirable, however, to employ the oiling operation prior to buffing when materials of this nature are to be finished. This is necessary if die lines or other surface markings are to be removed.

One of the difficulties encountered in finishing aluminum by buffing process is that particles of aluminum build up on the polishing wheel, which may cause gouging of the metal surface. The use of proper lubricants is beneficial in correcting this situation. The embodying of abrasive particles into metal surfaces can also be troublesome, particularly when the article is to be treated by either of the Alcoa processes—the Alzak reflector process or Alumilite-or electroplated. An acid or alkaline pickling operation between the buffing and coloring process is helpful in removing such embedded particles.

Scratch brushing is another form of mechanical finishing that is extensively used to break up large areas of flat surface, or to impart a defined surface appearance. Prior to such treatment, all grease, dirt, surface scale, and other blemishes should be removed. Dirt can be eliminated by means of a suitable cleaner. Alkaline baths, or organic solvents are frequently used. Surface scale may sometimes require an acid pickle, such as a mixture of chromic acid and sulphuric acid; mechanical surface blemishes, such as scratches or pits, can be removed by buffing.

The coarseness or fineness of the finish is governed by the size of the wire used in the brush. Wheel size is determined by the nature of the work, but generally wheels 10 in. in diameter, or less, and made up of 0.015in, diameter wire are used. A wheel speed of 2000 rpm is usually satisfactory. Wires may be of brass, stainless steel, nickel, or German silver.

Upon completing this scratch brushing operation, the parts should be immersed in concentrated nitric acid, or a 50-50 mixture of this acid with water, to dissolve out minute particles of imbedded wire. If allowed to remain, these particles provide a poten- (Please turn to Page 115)







Welding RESILIT

Obtained by Equalizing Current and Pressure

By MALCOLM THOMSON
Thomson Laboratory
General Electric Co.
Lynn, Mass.

qualization in multiple spot welding and heating achieved quite simply by separating secondary ircuits, having one transformer wound with indiidual secondary coils, one for each welding circuit

IN making multiple spot welds simultaneously it is deable that there be some means for equalization of curnt and pressure. Special machines are sometimes built ith individually mounted electrodes and individual transmers. These machines are in effect a multiple groupg of spot welders in the same frame.

A somewhat similar method of equalization is achieved uite simply by separating the secondary circuits by havg one transformer wound with individual secondary ils, one for each welding circuit.

In many cases the use of such special machines is not arranted from a cost standpoint; for this reason, quite ten two, three, or more electrodes derive their current om one transformer, a standard spot welder being used. sually little or no consideration is given to equalization current, although pressure is equalized by separate ring loading or its equivalent.

Our original problem was not one of multiple spot elding but of resistance heating gear teeth for hardening, he particular pinions involved had five pitch teeth, the p dimensions of the teeth being 3/16 x 3 in. A number trials had been made with solid electrodes, both with

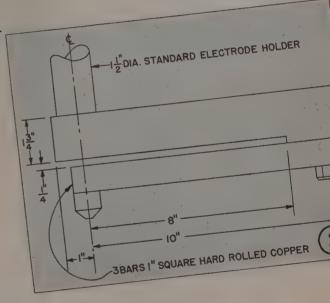


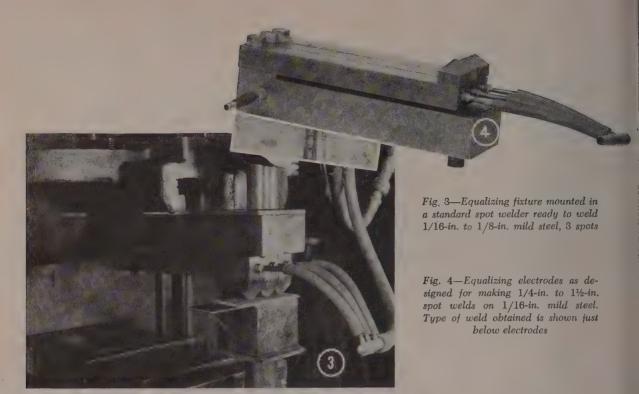
Fig. 1-Steel pinion hardened electrically

Fig. 2—Outline and dimension diagram of design for current and pressure equalizing electrodes

and without swivel mounting of contacting electrode, but results were unsatisfactory, since it was practically impossible to maintain current and pressure equalization over such an extended area.

A special electrode assembly was then designed that used three 1-in. square hard-rolled copper bars as cantilever type springs. Overall dimensions are indicated in Fig. 2. It will be noted that the effective length of the springs is 8 in. Each spring will carry a load of about 500 lb with a deflection of 1/6-in.

The fixture is so designed that the springs cannot be damaged by overloading, seating occuring before their electric limit is reached. Since the secondary current is



carried in three separate paths with appreciable resistance and reactance in each path, it becomes evident that not only is pressure equalized, but current too, at least to a considerable degree.

For heating gear teeth, uniform results were obtained using the following settings: 13.5 sec, 13,000 amp, 1300 lb. Teeth electrically heated and quenched in water, however, are hard all the way through and have a marked transition zone at base of tooth, as shown in Fig. 1. Such hardening is not desirable from a gear engineering standpoint. In spite of the lack of success for gear tooth hardening, the purpose of getting a 3-in. longitudinal spread of uniform heating was accomplished.

Multiple Spot Weld Fixture

It was then decided to try out the fixture for making multiple spot welds spaced 1 in. apart on centers. Fig. 3 shows the fixture for this setup mounted in a standard spot welder. It also illustrates method of water cooling. Welding electrodes are under a total pressure of 1500 lb (500 lb each) ready to weld three spots on 1/16-in. to ½-in. thick mild steel. The deflection of the springs in this case was about ½-in. Very good results were obtained using the following settings: 15 cycles, 1500 lb, and 28,000 amp.

In addition to regular multiple spot welding various combinations were tried, such as one projection weld and two spot welds, three projection welds, two projection welds and one spot weld. Since the individual springs take care of discrepancies in height, no difficulty was experienced with such combinations.

New tips were then machined to give a ¼-in. x ½-in. contact area, actually made up of three ¼-in x ½-in. adjoining areas. In spite of the fact that this setup gives some torsional twist to the two outside springs, no dif-

ficulty was experienced in satisfactorily making spot welds on 1/16-in. to 1/16-in. mild steel with dimensions of 4/4-in. x 1½-in. The slug in these welds is continuous over entire length. Fig. 4 shows electrode design and type of weld obtained. Settings used for the 1½-in. long weld were 20 cycles on, 1 off, three times (equivalent to 1 sec), 1200 lb and 27,000 amp.

While in the photographs the lower electrode is a flat block, this type of construction was used for simplicity of setup only. It would be desirable to use separate lower electrode points and these preferably adjustable for alignment and wear.

While the fixture as designed had certain limitations, mainly due to limited maximum pressure obtainable without collapsing the springs, the results proved that the secondary current of a resistance welding transformer may be split into approximately equal components, provided the individual circuits have individual reactance and resistance which in effect act like choke coils. In other words, an equalizing effect not obtainable in a single circuit is obtained. The design also insured accurate equalization of pressure over a considerable area. Furthermore, this design provides the minimum of inertia in the individual welding electrodes, giving very rapid follow up. The follow up, in fact, is practically instantaneous.

The type of electrode mounting used suggests other possibilities. For example, the electrodes may be arranged in a circle for ring projection welding. Also, the effective length of the individual springs can very easily be made adjustable to compensate for pressures being used, or they may be kept constant in length by adding supplementary individual loading springs or air cushions for varying the pressure. As originally designed, pressures obtainable were too low for satisfactory stainless steel welding.

EGREE of efficiency possessed by a plant is often measured in terms of the storesroom. If the stores department is badly organized, unplanned, and inefficient, the same descriptive terms can probably be applied to the plant as a whole. The storesroom is the starting point in plants—most phases of plant control and plant operation are affected directly by the activities in the storesroom; all other phases are effected indirectly.

Not only are operations of machine shops and assembly departments dependent on the flow of materials out of stores, but production control, stock control, purchasing, accounting, and all other records are set up to reflect conditions in the stores department. It is on the basis of these records that production schedules and plans are drawn up; consequently, inaccurate records are costly and of little usefulness.

Also, material handling problems are greater in an

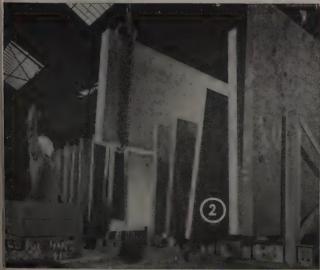
Storing Engineering

Systems of storage are appraised for space requirements, handling requirements when stored, accessibility, etc., and suggestions are made for improving efficiency of existing methods

Fig. 1—Example of how galvanized sheets are stored on dunnage

Fig. 2—Welded vertical racks used for storing heavy steel plates. Metal is directly accessible from above by overhead crane. Dimensions are marked clearly on plates

Fig. 3—Tubing stored on dunnage. Each pile containing material of like size and type. Upright tubes between piles of material prevent materials from rolling to floor







quickly and correctly. (4) The storesroom should be organ-

ized carefully so that material handling costs are reduced.

(5) The activities, location, and functioning of stores departments must be integrated with all other phases of plant production.

Steps to be followed in achieving the correct stores set-up for each plant vary with the nature of production, materials stocked, location of stores, etc. Broadly speaking the basis of a soundly conceived storesroom is made up of four parts (1) The grouping of materials in the various stores areas, (2) layout and phys ical aspects of the storesroom, (3) stor age facilities, (4) planning activities.

With the increased use of speedy material handling and material move ment devices, the question of location or stores takes on less and less importance It is of little consequence whether a for truck moves a load of material 10 ft a hundred feet, or a thousand feet. Thi is true of almost all other material han dling devices that are electric or motor driven. Distance between stores and other departments of the plant is o little importance if the distance "bridged" by correctly used material han

If there is sufficient space in one build ing to store bar stock, tubing, sheets plates, and other materials, the use o this space for all engineering material as a centralized storesroom would be very much desirable. When space is lacking the storesrooms are usually divided into three categories: (1) Raw stores for bars rods, tubes, plates and sheets; (2) cast ing storage for castings, forgings, strip steel, and other materials purchased it a semi-fabricated form; (3) finished stores for completely machined part and for purchased parts.

Although this breakdown is an arbi

NOW: You Can Meet 95% of Your Alloy Steel Needs with Only 2 Steels!



and reduced inventories . .

Where you once had to select from dozens of alloy steels, you can now simplify selection, fabrication and inventory with these two Chrome-Nickel Alloys! And the best part of it is that you can get these two steels right from local Carpenter warehouse stocks. You get the steel you need-when you need it!

For the full story on this "team" of Carpenter Chrome-Nickel Alloy Steels to meet 95% of your requirements, ask for the new booklet, "Two Steels Simplify Your Alloy Needs". Your nearest Carpenter warehouse is listed below. For your copy just write a note on your company letterhead.

Available NOW From Your Carpenter Warehouses

INDIANAPOLIS NEW YORK PROVIDENCE

Carpenter



ALLOY STEELS

. made in a tool steel mill ... inspected by tool steel standards.



139 W. BERN STREET, READING, PA.



trary one; it is sound for materials actually group themselves. Bars, rods, tubes are all long and require special types of racks. These engineering materials must be located near cut-off machines. The same protective measures must be given to these materials and the storage procedures are basically the same. The same applies to the other two stores categories,

Certain materials do not classify themselves quite so readily. For example, bronze tubing used to make bushings may be considered as belonging either in raw stores or in casting stores. In all such events where storage classification of materials is uncertain, a definite procedure should be established. For, if material is stored as bar stock at one time and as a casting at another, records will be confused and the materials will be unavailable when required. This can be facilitated if purchasing department

keeps check of these materials. Purchasing should note on the purchase order the destination of all incoming materials.

In addition to the above-mentioned three general categories of stores areas. In some plants where the maintenance department uses a good deal of bar stock, pipes, tubes, and other materials, a separate storage area is set up in the maintenance department under the supervision of this department. In this way, materials needed by maintenance are not taken from regular stores. Materials ordered for regular production work are thereby not drained off into nonproductive maintenance tasks.

Many plants maintain a separate storage area in the tool room for the handling bars of tool steels. Since use of such metals is usually restricted to this one

(Please turn to Page 126)

Fig. 8—Each section of the "pigeon hole" rack is directly accessible eliminating need for ladders to reach top sections of rack. Each rack section is used for only one size of tubing, size being painted clearly on cross-beams. Close sizes are racked in different sections. Thus, 1-1/4-in. I. P. S. tubing is four sections from the floor while 1 1/4-in. 16ST tubing is in the top row

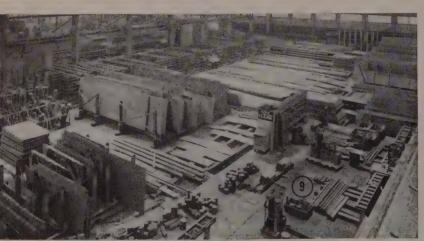
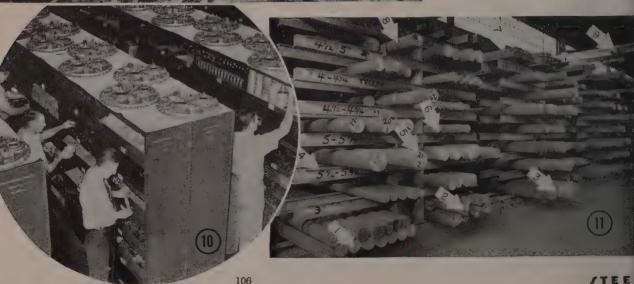


Fig. 9 — General view of a typical storage area showing lower left, plates in vertical racks, left center, bar shorts in grand-stand rack, center background, bars in Goldberg racks

Fig. 10—Top of rack is utilized for storage of other materials

Fig. 11—Cold finished and hot rolled square, flat and round bars stored in Goldberg racks. Desirable features of this system are pointed out by the numbered arrows





VOL. XI NO. 1

This is page 1 of the current issue. Write for the complete issue today.

ALSO IN THIS ISSUE

Avnamometer Research... p. 2

New Gear Literature..... p. 3

No Divided Responsibility. p. 4

CIFIC-WESTERN NDLES CONE-DRIVE ARING ON COAST

Jone-Drive gearing and Coneve speed reducers, both standand special, are now availe to industry in eleven West ast States directly through stern Gear Works and Pacific ar and Tool Works.

Through this arrangement, stern Gear Works and Pacific ar and Tool Works who have an engineering, manufacturand distributing gear prods and speed reducers on the rific Coast for over 50 years, ke available not only their rineering skill and facilities on cial installations but also ck delivery on the newly ndardized Cone - Drive gear and speed reducers—newest 1 most striking developments the gear field.

GEAR OUTPUT BOOSTED 200% per Machine by UNDERPASS Curve-Shaving

A 200% increase in output per gear finishing machine—brought about by combining underpass shaving and "curve-shaving"—is reported by a major motor vehicle manufacturer. The gear on which comparative runs were made was a cast iron timing gear for automobile engines, an 8 pitch 24 tooth type with a 78" face. Stock removal is approximately .004" to .006" over pins.

Originally about 36 gears were turned out per hour on each of the conventional gear finishers that used axial cutting reciprocation and a rocking action to relieve ends of gear teeth. The first Michigan Tool Company underpass curve-shaver installed upped the output to 110 gears per hour. Operating on the principle of tangential rather than in-feed of the cutter, the machine does not use lateral cutter reciprocation. The cutter is reciprocated once tangentially to the gear while the two are rotating in mesh (Fig. 3).

Continued on Page 3

ANNOUNCE Standardized CONE-DRIVE GEAR SETS

Standardized Cone-Drive gear sets in 99 sizes and ratios are now being carried in stock by the Cone-Drive Division of Michigan Tool Company.

The standardized sizes have been developed to facilitate the work of design engineers, etc., in

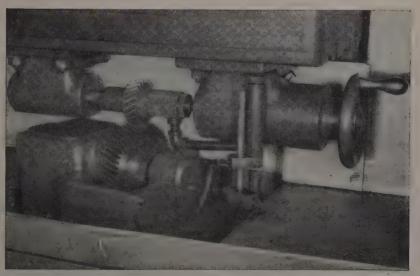


Typical standard Cone-Drive gear and pinion set now carried in stock.

quickly selecting the size and ratio of gear best suited to each specific power transmission requirement. Cost reductions on purchase of gear sets and expediting of deliveries are natural consequences of

Continued on Page 2

Fig. 1—Michigan underpass curve-shaving machine in which curve-shaving action is designed into the cutter. Produces 110 gears per hour with .004" to .006" stock removal.



MICHIGAN TOOL COMPANY

7171 East McNichols Road DETROIT 12, -- U.S.A.



Bright Copper Plating

New process features simplicity of practice and equipment, and helps overcome the lag in progress between electrodeposition of copper and subsequent application of other metals on steel and die cast parts

MIRROR-BRIGHT copper deposits are obtained directly from a simple cyanide copper plating solution over a broad range of operating conditions by a new process developed by MacDermid Inc., Waterbury, Conn. This bright copper plating process contributes substantially toward overcoming the lag in progress between electrodeposition of copper and the subsequent similar application of other metals on steel and other parts

By L. E. BROWNE Associate Editor, STEEL

that are to be plated.

Without intermediate buffing operations, the MacDermid process makes possible improved economies in copper, nickel and chromium plating of zinc-base die castings and other soft metal parts. Excellent covering power of the bath and denseness of the copper deposit reduces trouble experienced with black streaks appearing in the subsequer nickel deposit when plating zinc-bas die castings.

Steel parts plated with bright copper can readily be buffed and the copper flowed into scratches, polishing mark and other surface defects because of smoothness and softness of the copper deposit. Probably one reason for labetween electrodeposition of copper ansimilar application of other metals habeen due to the fact a large volume of copper plating has been applied as undercoating primarily, rather than as final plated surface.

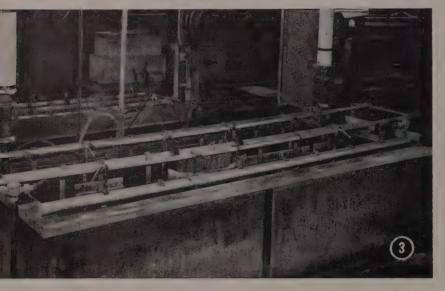
An outstanding feature of the Mac Dermid process is simplicity of practic and equipment, with materials readil available in commercial quantities; an also giving quality results with control no more complicated than those require

(Please turn to Page 128)

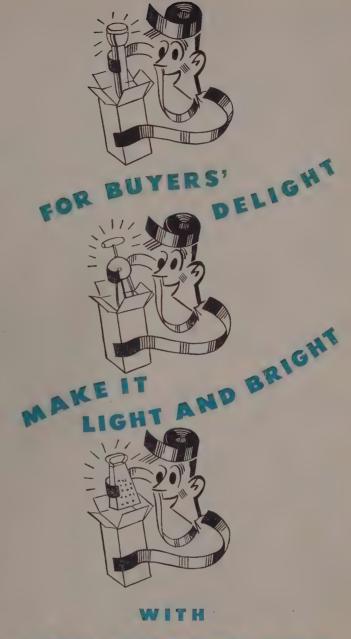
Fig. 1—Miscellaneous bright-coppered small parts require no further buffing of finish

Fig. 2—Bright-copper-finished steel parts. Note wide variety of surfaces

Fig. 3—Plating tank and equipment used in the bright copper process is simple in design



• THERE'S SALES APPEAL IN STAINLESS STEEL, It's one sure way to make your product better, influence more sales . . . CMP light gauge stainless gives you more han product sales appeal ... You gain abrication economies, too, with less down-time and longer die life, because you receive coil-after-coil dimensional accuracy, physical properties and chemistry tailored for your special requirements, and a quality finish that's a beauty ... CMP Stainless Thinsteel is produced in gauges thin as .001", in popular chrome and chrome-nickel grades, and in all tempers from dead soft to full hard ... Check now for deliveries and complete information.



STAINLESS

THE COLD METAL PRODUCTS CO.

YOUNGSTOWN 1, OHIO

NEW YORK • CHICAGO • DETROIT • ST. LOUIS BUFFALO • DAYTON • LOS ANGELES

COLD FACTS ABOUT STAINLESS

THINSTFFI

- EXTRA LONG COILS
- ...less downtime • EXTREMELY CLOSE
- **TOLERANCES**
 - ... more parts per ton
- WIDE RANGE OF PHYSICALS AND ANALYSES
 - ...tailored for your products
- GAUGES THIN AS .001"
 ...strength with lightness



MAXIMUM PRODUCTION PER TON

ch 17, 1947

Engineering News at a Glance

SEALS POROUS CASTINGS: New method of sealing porous metal castings which must be pressure tight was revealed recently by the plastic division of American Cyanamid Co., New York. Success of the process depends on the use of a polyester resin known as Laminac. According to the company, microscopic flaws in castings may be eliminated by impregnating them with the resin. In addition, the resin also provides a surface which prevents steam corrosion.

METAL COATED CERAMIC BEAR-INGS: German newspapers reported recently that a porcelain factory at Hersdorf, Thuringia, has begun to manufacture ball bearings with a ceramic core and a thin metal cover, said to have wearing qualities almost equal to those of steel. Germany's ball bearing industry was one of the prime targets of Allied bombers during the war.

HARNESSING COLOR ENERGY: In selecting focal color for a machine it is important not only to choose one that is in sharp contrast to the noncritical parts of the unit, but also one that affords a clearcut contrast with material being fabricated, it was learned from Pittsburgh Plate Glass Co., Pittsburgh. For example, a focal color of light gray is completely wrong if the material is aluminum or stainless steel. The worker is straining constantly to see where the material ends and the machine begins. There is no easy-to-see line of division. Ideal solution is one where the focal color provides a good contrast with both the stationary part of the machine and the material flowing through it. When this double contrast is achieved, eye travel is discouraged and tension is reduced.

SUPERSONIC "TEST TUBE:" Latest military aircraft to be propelled by General Electric's torpedo-shaped TG-180 gas turbine, the D-558 Skystreak, is literally a supersonic "test tube"-designed to surpass present day limitations of speed in the trans-sonic range-between 600 and 750 mph. Unveiled at El Segundo, Calif., by the Navy, NACA and Douglas Aircraft, the plane, besides pilot, will carry 500 lb of scientific recording instruments. The jet engine occupies the major portion of the fuselage -air entering through the nose of the plane, flowing in separate ducts around the cockpit, through the gas turbine, emerging as propulsive exhaust from the tail. Entire front section also is jettisonable. In emergency, the pilot breaks the compartment clear and, when it slows down in its fall, he bails out. The craft differs from other planes of its own class in its ability to take off, climb, perform level speed runs and return to the starting point under its own power. It is scheduled to make its first speed runs for the Navy this spring at the Army's air base at Muroc, Calif.

LARGE-SCALE HANDLING: In the United States, the huge steel industry handles more materials per ton of finished product, and in a greater variety of ways, than any other large-scale manufacturing industry in the world, Charles M. Parker, secretary of the committee on manufacturing problems, American Iron and Steel Institute, stated recently. It is estimated that for every ton of finished steel shipped, 68 tons of raw materials, steel-in-process, by-products and waste products are handled. Internal freight, or total principal materials handled during 1945, for example, add up to the astronomical figure of 3,913,000,000 net tons. In walking through a steel mill, he said, some of the "materials" are not obvious to the uninitiated-such as air blown into blast furnaces and bessemer converters, and the water which cools the blast furnace tuyeres and boshes and rolling mill rolls. But they do have weight and bulk. and they must be moved efficiently and economically.

RADIUM'S PENETRATING POWER: Although International Radium Commission's tolerance distance for 200 mg (table VII, "Industrial Radiology", John Wiley & Sons) is 6 ft for occasional exposure to radium, and 10 ft when exposed continually, length of time for continuous exposure must be stated before any value can be attached to such figures, in the opinion of Herbert R. Isenburger of St. John X-Ray Laboratory, Califon, N. J. For example, during a recent radium experiment, some film was exposed at various distances for a period cf about 100 hours at various times over a period of 8 days. Amount of radium was 200 mg, and the steel castings placed around it ranged in thickness up to 4 in. Next to this setup was an automobile and an 8-in. cinderblock wall with rockwool insulation and stone wal board. All this had to be penetrated before the gamma rays could reach the film and expose the lead numbers at tached to the surface of the film holde facing the radium. The fact the num bers appeared on the film at distances of 20, 30 and 40 ft indicates it is unfit fo any person to work in such surround ings when radium work is being per formed regularly. In addition a cor tainer can by no means be considered safe place to store radium, or even transport it when driving a car. Wit a 1/8-in, sheet of lead on top of the ship ping container, 200 mg of radium gav a dense exposure over an 8-hour period The lead lining of the container was

CORES IN 30 SECONDS: Automati induction heating equipment now is being used for baking cores for casting reducing time required from 3 hours t about 30 sec. It is reported the core may be handled immediately upon moval. During the operation a resibinder is used.

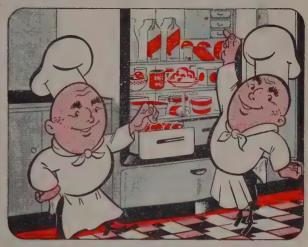
OVERLOOKED STEEL PROPERTY In tests to determine strength of larg welded steel structures, brought in prominence by Liberty ship failures during the war, the Bureau of Standard Washington, discovered that factors design, as well as welding, have an effect on the initial formation of a crack According to the bureau report, continuation of the crack depends upon the notch sensitivity of the steel, a proper overlooked in past specifications for shiplate.

PROGRESS DESPITE INACTIVITY Allis-Chalmers Mfg. Co., Milwaukee, r ports significant progress in developmer and design work on most of its highl diversified lines of industrial produc ranging from steel processing to pre cision casting, induction heating an betatron radiography for the metalwork ing industry, despite curtailment of ac tual production during the past year. few typical development projects, a cording to the company's engineering "Review," include the analysis of su face structure in bearing materials wit the electron microscope by means of th replica technique; better utilization oriented steel properties through prope processing of raw stock so that elec trical transformers can be made lighte and smaller; and new types of ename

How to bait a man trap



BAIT FOR a mantrap can be a luscious ice box cake, topped with frothy whipped cream, a crisp, fresh salad r a cold bottle of beer. Whatever suits a man's fancy best is is wife's sure way to anything from a trip to the movies a new fur coat. But she can't set the snare by herself.



MILADY'S silent helper is her modern refrigerator. With its temperature regulator, rapid ice cube maker, frozen food compartment and a dozen other gadgets, it gives free play to her culinary talents. But refrigerators weren't always as dependable as those that grace kitchens of today.



BUNDYWELD Tubing in condenser coils, compressor lines and connecting tubes helped bring new dependability refrigerators. And Bundyweld's hundreds of other uses clude carrying fuel, oil, lubricants, vacuums and hydraulic uids in motor vehicles and gas in modern ranges.



BUNDYWELD is different from other tubing. A single strip of basic metal, coated with a bonding metal, is rolled continuously twice laterally into tubular form, then metallurgically bonded by intense heat—carefully controlled to form a solid, double wall tube, held to close dimensions.

SPECIFY BUNDYWELD! That's the recommendation today from an army of engineers and product esigners who recognize the advantages of this unique, perior tubing. Let Bundy Research and Engineering repartments illustrate the advantages of Bundy Tubng for your product. Available in steel, Monel and nickel. Trite: Bundy Tubing Company, Detroit 14, Michigan. ENGINEERED TO YOUR EXPECTATIONS

- BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

icific Metals Co., Ltd. 3100 19th St. an Francisco 10, Calif.

Standard Tube Sales Corp. Lapham-Hickey Co. 1 Admiral Ave. Maspeth, N.Y.C., N.Y.

Chicago 32, Illinois

Rutan & Co. Eagle Metals Co. 3333 W. 47th Place 404 Architects Bldg. 3628 E. Marginal Way Phila. 3, Pa. Seattle 4. Wash.

Alloy Metal Sales Ltd. 861 Bay St. Toronto 5, Canada

with thermal expansion coefficient to match those of various alloys compositions. The publication also describes the first United States installation for production melting of high-grade alloy steels using mercury are frequency converting equipment, and mentions that orders are now on hand for several other similar steel melting installations.

CONTROLS ZIPPER MACHINES: Dual predetermined electronic counter manufactured currently by Potter Instrument Co., Flushing, N. Y., is now used by the zipper industry to control precisely the fastener length and spacing between. It not only provides accuracy in the operation, but also speeds up production considerably, not to mention the reduction in production costs by eliminating repair and inspection labor. The old system, which limited the top speed of zipper machines, consumed much time during the fastener length-changing operation, since special gears or cams were required for each of the different zipper lengths.

ALTERNATIVE MATERIALS: When a designer of a motor or other device, requiring a soft magnetic material, finds himself under pressure to decrease its size or weight, he can consider Hiperco, a magnetic metal high in cobalt. It can be forged, pressed or rolled into desired shape. It has the property of permitting

a higher flux density, obtained with a lower magnetizing force than ordinary materials. In aircraft generators and motors, for example, it permits up to 10 per cent overall reduction in size and weight. After annealing, it is somewhat more brittle than other materials, thus requires care in assembling. According to Westinghouse Electric Corp., Pittsburgh, cost is more than conventional materials, hence its use is determined by the worth of the actual benefits it provides.

"SEA-POWER" GOES ASHORE: Pacific Gas & Electric Co.'s novel solution to the shortage of central station equipment for additional electric power in the Humboldt area of California is the stern half of the former Russian tanker, the SS Donbass III. Permanently moored at the Eureka waterfront, the 6700-hp General Electric steam turbine-electric marine power plant of the salvaged vessel is supplying electric power to the inland area. A bank of transformers was installed on the dock alongside the halved ship to feed power directly into a 12-ky transmission line. The former tanker broke in two about a year ago in the Gulf of Alaska.

CAUSE OF POOR RINSING: Too much emphasis cannot be attached to the necessity of proper rinsing, L. W. Collins, a specialist in the metal section of Oakite Products Inc., pointed out re Failures in plating, picklin phosphate coating and organic finishin often may be traced directly to poo rinsing caused by a wide variety of factors or combinations of factors. Son of the causes are as follows: Rins tanks may be too small, or they may h improperly constructed so that contan ination is inevitable. Waste water has dling facilities may be under-size for the volume of the supply. Cases are man where cold water was used when a he rinse was necessary and vice versa. Sti tank rinsing is inadequate where a run ning rinse is required. Running rins won't work where spray rinses are ind cated. Plain spray rinses fall down air-water rinses are demanded. To short a rinsing time in the cleaning cyc also is a serious factor.

MAKES MOST OF STEAM HEAT Custom size high-pressure system fa heaters now supplied by Niagara Blow Co., New York, uses a dual coil syste to utilize completely both latent ar sensible heat of high pressure steam heating. The system is installed in a fa heater of standard design in which air drawn through the heater by centrifug fans. High pressure steam is condense in a finned coil, the condensate flowing into a trap from which it is admitted the regenerative vapor coil entering the header where it flashes into vapor. Ar of the high pressure condensate remain ing liquid at this point is drained direct ly to the final condensate return head by a hairpin bend tube from which t condensate gives off its heat into the a stream.

EVALUATES FINISHES: Evaluation of surface finish or roughness is obtained by a new National Bureau of Standar method in which a carefully prepare plastic replica of the surface is analyze by photoelectric means. According the Washington bureau, the analyze developed by Harry K. Herschman the metallurgy division, is based on the use of a plastic replica of a surfawhich reproduces in minute detail t protuberances and recesses of the st face. The replica is produced by appl ing a suitable solvent to the test surface and pressing on a strip of clear plast When dry, the film is readi stripped from the surface. Evaluation consists essentially in passing a restrict beam of light through an oscillating re lica, then through a suitably restricting diaphragm onto a photoelectric cell. The replica is oscillated with respect to t light beam in a straight line or in curved path with the path of moti maintained so the beam crosses t "humps and valleys."



GAS FLUSHING STEEL: Application of a flushing process, developed by engineers of Air Reduction Sales Co., New York, by which dry nitrogen or argon is bubbled through molten steel eliminates dissolved hydrogen efficiently and at a reasonable cost. Specimen at left shows resultant porosity that may develop when dissolved hydrogen is not permitted to escape the steel while being cast. The one at right shows clearly results obtained when flushing process is used. Only equipment needed, the company states, is a supply of dry nitrogen or argon, and a special tube to introduce the gas in form of tiny bubbles.

Aechanical Finishes

(Continued from Page 100)

I nucleus for local attack if the article ould later be subjected to corrosive nditions. This is particularly true when ass wires are used.

Before applying the scratch brush ish to castings, the surface should be ven a "dust" blast; if the surface of a casting is exceptionally rough, a edium sand blast may be necessary. It is necessary to the exception of wheel speed, the ethod of application is identical with a procedure for other forms of alumum. For castings, a speed of 500 to 0 rpm gives the best results. Higher the procedure for other forms of the metal surface and a consequent the metal surface and a consequent of uniformity in the final finish.

As the wheels are used there is a adual accumulation of metallic alunum particles on the wires. This resistates frequent cleaning, which may done by holding a pumice stone or t brick against the revolving wires. It is also advisable to reverse periodicty the direction of rotation of the wire ush. This will compensate for bendand wear of the wheel.

Satin Finished Aluminum

modification of the scratch brush ish is the satin finish, which imparts oft, smooth, sheen to the surface, but ich has less luster than the highly or buffed surfaces. This soft effect ults from the tiny parallel lines atched on the metal surface. It is duced by the use of a finer wire sh wheel or by abrasives. Wires of 02 to 0.005-in, in diameter are most n used; the finer the wire the finer texture of the finish. Some difficulty y be experienced in applying this sh uniformly to large areas. A furr rubbing of the satin finished surface h steel wool, dipped in oil and emery vder, and a final cleaning with a while the article is still revolving, ult in an attractive silvery effect. el wool lubricated with soapy water, greaseless polishing compound, can be used to satin finish aluminum. When castings are to be satin finished s advisable to first polish and then I them, using a felt wheel with a aseless polishing compound. The rseness or fineness of the finish will, course, depend upon the grade of shing compound used. A very fine sh may be obtained by using a rotatfiber brush, or by hand rubbing with umice and oil paste.

fter this preliminary surface polishing astings, with No. 120 or 180 emery, ensuing buffing operation gives a sfactory base for the wire brush satings. On large surfaces, however, a fine

sand blast before wire brushing is quite essential to the production of a uniform satin appearance. In order to obtain successful scratch brush or satin finishes it is imperative that the surfaces be free of oil, dirt, and scale.

Hand hammered finishes find their greatest application in novelty and gift items. In effect, these finishes closely resemble hand wrought, or oxidized silver. These finishes are obtained by heating aluminum in a smoky coal fire and performing the hammering operation while the work is covered with a fine layer of soot. Part of the black layer is embedded in the metal, after which the raised areas of the work may be relieved by abrading them lightly with emery cloth or steel wool.

Fluting Aluminum Sheet

Fluting, the rolling of parallel lines into the surface of aluminum sheet, provides another attractive finish. It is quite inexpensive, but can only be applied at the mill. The finish produced in this manner effectively hides the structure markings on aluminum that is subsequently to be given an Alumilite finish for protective as well as decorative purposes.

Sand blasting is another rapid and inexpensive method of finishing aluminum. Where appropriate, it gives a uniform matte finish. Because of the surface roughness, however, the plain sand blast surface will collect dirt. This situation may be avoided by protecting the surface with a clear synthetic plastic coating, which permits easy maintenance by washing.

The sand blasting materials used for aluminum vary in size from 6 mesh to "dust", and the air pressure from 10 to 90 lb. These abrasives range from silicon sand to steel shot; washed silicon sand, however, is most commonly used.

A variety of color effects may be obtained with different abrasives. Silicon sand and steel shot give a light gray color, pulverized silicon a light blue cast, and carborundum sand a dark gray. Metal abrasives are not favored, inasmuch as the embedded particles on the aluminum surface may cause discoloration upon oxidation. To secure uniform sand blast finishes, standard operating conditions should be established. The four major factors affecting uniformity are air pressure, rate of introducing sand (of which nozzle size is a factor,) grade of sand or abrasive, and nozzle-to-work distance and nozzle angle. Once these conditions are selected they should be adhered to carefully.

Very attractive effects may be obtained on aluminum articles by a process known as "highlighting." This finish has been widely used in architectural work and on such items as refrigerator evaporator doors, panels and other hardware. Its decorative possibilities are almost unlimited.

Such a finish is produced by a combination of surface treatments. For example, the background may be "dust" blasted and the raised, or embossed, areas buffed or satin finished. To accomplish this, the raised areas should be protected by some type of "stop-off" material such as adhesive tape or suitable lacquers while the background is sand blasted. A suitable stencil may be used in place of the "stop-off" material. The sand blasted background may then be bleached by a caustic treatment and the highlights brought out by buffing. Usually, an Alumilite finish is applied as a final operation to protect permanently the entire surface. Where the dust, or sand blasted aluminum surface is to be Alumilite-processed it should be "bleached" after sand blasting to insure color uniformity. Through the proper use of suitable alkaline or acid "bleaching" agents, comparatively white surfaces can be obtained on aluminum and certain of its allovs.

Ball Burnishing Treatment

Where the low selling price of an article forbids hand labor, a low cost and satisfactory finish may be applied by means of ball burnishing. Such treatment imparts a bright, fairly smooth surface by the action of steel shot rubbing against the aluminum parts. It is accomplished by tumbling the work, together with steel shot, in a wood lined barrel, using soap and water as the lubricant. The size of the shot to be used is determined by the size and shape of the pieces to be burnished. For general work 5/32-in. diameter steel balls are satisfactory, and ratio of shot to parts should be about 2-1 by volume.

The work is first cleaned by washing in a suitable alkaline, organic, or acid pickling solution. The washed work and steel shot, in proper proportion, are placed in a barrel, which is then filled about two-thirds full of cold water. Soap flakes are added in a quantity determined by the size of the barrel. For a barrel approximately 8 in. wide by 30 in. in diameter, about 4 oz of soap flakes will be sufficient. The barrel is then rotated for approximately 1/2-hour at a speed ranging from 25 to 35 rpm. Upon comple-tion of the first cycle the barrel is opened, the dirty water removed, and the barrel rinsed. Fresh soap and water are again added in the same proportions as before. Rotating time for the second cycle will depend upon the size of the part, the finish desired, whether dipping was used before burnishing, and whether a full load is being burnished. All these



PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MACPHERSON



TRANSPORT OF PETROLEUM TO SERVE YOU WOULD BE WASTEFUL, SLOW, COSTLY—WITHOUT STEEL

Without steel, the petroleum that serves you in so many ways would still come out of the fields in wooden barrels. Transport would depend upon wagons, or flatcars with big wooden tubs. It might have to resort again to artificial floods, such as were operated during the "Oil Excitement" in Pennsylvania to sweep loaded flatboats down Oil Creek into the Allegheny and on to Pittsburgh. Lives were lost, great quantities of priceless petroleum were wasted when flimsy craft were wrecked in this frenzied rush to markets.

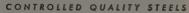
With steel, petroleum and its products and natural gas are transported to distant markets swiftly, inexpensively and without waste in pipe line systems that criss-cross the country. Thousands of miles of them are line pipe manufactured by Jones & Laughlin Steel Corporation of Controlled Quality Steel. Other J&L steels are components of tank cars and trucks, tank ships and barges.

Tomorrow, steel and petroleum research will develop still stronger, tougher steels. With these the oil and gas industries will achieve still better transportation for their many products so vitally essential to our mechanized civilization.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH

SALES OFFICES: Atlanta * Baltimore * Boston * Buffalo Chicago * Cincinnati * Cleveland * Columbus * Dallas Denver * Detroit * Harrisburg * Houston * Indianapolis * New Los Angeles * Memphis * Milwaukee * Minneapolis * New Haven * New Orleans * New York * N. Kansas City Philadelphia * Pittsburgh * St. Louis * San Francisco * Seattle South Bend * Syracuse * Toledo * Tulsa * Washington





PIPE LINES

"Without the pipe line," says the story of 85 years of the oil business published in 1944 by the American Petroleum Institute, "oil literally would have backed up into the wells for lack of outlet, and the needs of modern civilization been left unsatisfied."

5 million barrels of crude oil are handled every day by pipe line systems in U.S.

A pipe line pousse-cofé is development of petroleum research, whereby 14 different petroleum products today may be transported at same time in same pipe line without mixing, as in making a poussecafé, gay 90's colorful tipple of liqueurs in layers of different specific gravities.

1st successful pipe line was laid in 1862 by Barrows & Co. to transport oil from Tarr Farm (Oil Creek) to nearby refinery.

"Pond freshets," (artificial floods) were operated in Oil Creek, before pipe lines were laid, to float boats to market loaded with oil in barrels and in bulk. Sawmill dams were opened, often twice a week, causing a quick rise in the stream. Waiting boatmen then cast off and went whirling down Oil Creek in their frail craft, watched by excited crowds. Jams often occurred. Boats were dashed to pieces against each other or bridge piers or dams. Men were drowned or crushed.

Entire cargo of a flatboat fleet of the 60's could be carried in one of today's 10,000-barrel steel petroleum barges operating on Ohio-Mississippi river system.

Disaster often hit oil fleets on voyage to Pittsburgh. An ice gorge in 1862 crashed into 350 boats with 60,000 barrels of oil aboard, crushing half of them, spilling the oil. Loss was over \$350,000. Fire broke out in one fleet, which tore loose and bridged the Allegheny with flames. One barge drifted to Franklin, Pa., burned wooden bridge there.

6,000 teams were engaged in oil hauling along Oil Creek in 1860. In one day 2,000 wagons passed through Titusville, Pa.

Actual photos of "pond freshets" in action on Oil Creek, found by Dr. Paul H. Giddens, curator of Drake Well Memorial Park, Titusville, Pa., among families of old-timers in the oil fields, were loaned to artist Orison MacPherson for guidance in painting "Oil Transport" on opposite page.

For free print of "Oil Transport," write Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

Tank trucks and cars of J&L Otiscoloy steel weigh less, carry more, last longer.

First "tank" cars were merely wooden flatcars equipped with 40-gal. wooden tubs.

For a free copy of J&L book, "Tubular Products for the Oil Industry," write nearest District Sales office listed at left, or Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

factors must be considered in setting up a standard time for burnishing.

More efficient burnishing is obtained with a small charge, since the pieces being finished will be in contact with the shot more often. This will allow the time of burnishing to be reduced. Pieces having sharp corners or threads may burn during the burnishing process and it is, therefore, necessary to restrict the amount of burnishing given articles like these.

Parts that have been dipped will take somewhat longer to acquire a bright surface than parts that have a machined surface. This results from the roughening of the surface by the dip and from the fact that the machined surface itself is somewhat bright.

Barrel Tumbling Method

The longer the burnishing time, the brighter will be the resulting finish. Consequently, for parts where a very fine finish is desired, burnishing time may be two or three times longer than normally required. As a general rule the total burnishing time should be about 1½ hours—½-hour for the first tumbling cycle, and approximately 1 hour for the second.

Another inexpensive mechanical finishing method is barrel tumbling, particularly useful in brightening and cleaning small parts.

Sand burnishing of large flat areas is sometimes employed to produce a relatively inexpensive "satin" finish on flat sheet surfaces. It is accomplished by abrading the aluminum surface with sand suspended in water. The burnishing action is produced by the rotating or reciprocating travel of the burnishing table or box, to the floor of which the aluminum sheet is fastened.

Any discussion of mechanical finishes for aluminum should include the buffing of reflector sheet, which is the treatment accorded to surfaces in preparation for the Alzak reflector process. It is necessary to be more careful in this operation than is usual for general anodic coating work. Although the buffing procedure for reflector surfaces contains no unusual operations, special care must be exercised to prevent imbedding of the buffing compound into the surface. Excessive "dragging" of the reflector surface may result in pitting during the reflector processing treatment. The buff used should be so constructed that dragging and gouging of the high purity aluminum surface can be avoided.

For handwork a soft buff is best; spindle speed should be 2800 rpm. A satisfactory buff 8 to 10 in. in diameter may be built up of 12 to 15 disks sewed together spirally, near the arbor hole. The cloth used may vary in thread

count from 64-68 to 84-92; the higher the thread count the harder the buff. Buff hardness may be regulated by means of 3 in. cloth disk separators between the large disks that make up the face of the buffing wheel. The more cloth separators used, the softer is the buff. Buff hardness increases with the speed of the wheel, and for this reason the latter is an important consideration.

The most common agent used for buffing aluminum reflector sheet is tripoli compound. Particles of this material which may become imbedded in the surface of the aluminum cladding during the operation should be removed prior to color buffing by treating the reflector sheet in a weak caustic soda solution, at approximately 120° to 140° F, for a period of 30-60 sec. A chromic acid-sulphuric acid pickle may also be used. Following cleaning, the sheet is color-buffed with a suitable coloring compound.

The Alclad coating must not be cut in color buffing or dark spots will appear on the reflector surface wherever the base metal is exposed. It is also important to avoid local overheating of the surface and dull areas which result from high buff pressure.

Preparing Surface for Paint Coating

There are numerous methods that may be used to prepare an aluminum surface to receive a paint or enamel coating, selection being governed by the type of service intended. In no way differing from the painting of other commercial metals, such as steel or brass, the surface of the aluminum work must be clean and free from grease, oils, and soil, if satisfactory adhesion of the organic coating is to be obtained.

For mild service such as interior applications, solvent cleaning is generally satisfactory for removing any oil acquired during fabrication or by handling. Where the article or structure is to be subjected to weathering, the treatment of the surface with a solution of phosphoric acid and alcohol will give a surface excellent for paint adhesion. A number of proprietary cleaners of this type are on the market and a federal specification covering their formulation is also available.

Where somewhat better paint protection is demanded, the application of an Alcoa coating, such as Alrok 14, gives excellent results. This treatment has been used for such applications as aircraft aluminum gasoline tanks, oil tanks, various aircraft instrument parts, and some architectural installations. Anodic coatings such as provided by the Alumilite process are a most excellent surface preparation as a base for paint and have been widely employed on aircraft and

in other services where the maximum assurance against any corrosive action is demanded. While these anodic coatings provide the best available base for paint they are in general also the most expensive and are only employed where the cost is warranted by service demands.

In some instances, surface roughening by sand blasting, scratch brushing, of caustic etching has been employed as a means of preparing the aluminum surface for a paint or lacquer coating. Such practices, except under special conditions, are not recommended, since surface roughening tends to impair the natural oxide protective film which is always present on aluminum.

Selecting Proper System

The selection of the proper paint system to be employed on an aluminum surface is, of course, important, and all though it is not necessary to utilize an special painting practice for applyin decorative coatings to aluminum, it is essential that the painting system applied for protective purposes be care fully considered from the standpoint of the expected service conditions.

As may be expected, the value of any protective painting system employed or aluminum surfaces depends first upon the selection of the proper primer. The primer selected should have good resist ance to moisture penetration, should ad here well to the aluminum surface should provide a good base for the sec ond coat, and should contain an inhibi tive pigment for the prevention of su face reaction. Zinc chromate is a pig ment that possesses pronounced corre sion inhibitive properties, and its use recommended in priming paints for alu minum surfaces. On the other hand lead pigmented primers should genera ly be avoided on aluminum. For les severe conditions of exposure, a num ber of other primers are satisfactory.

In many cases the use of an aluminum paint primer has given excellent result Once the primer coat is in place, almost any durable exterior paint or enaminated the primer coat is in place, almost any durable exterior paint or enaminated to the finish coat Widespread commercial application has been made of enameled or painted surfaces in conjunction with plain or colore Alumilite finishes. Where the colore aluminum paint is satisfactory, it is recommended because of its durability and high resistance to moisture penetration.

--0---

Rules governing installation, and to certain extent, use of electrical equipmer is contained in the 1947 edition of the Nitional Electrical Code recently prepare by National Fire Protection Association Boston. Its purpose, states the association, is to reduce the hazard from electrical fires and accidents.



YOUR STEEL

FOR IMMEDIATE PRODUCTION!

GENSCO is equipped to eliminate part of your production problems by processing your steel into desired sizes and edges for immediate and economical fabrication. If you have steel that is not processed to size, contact your GENSCO representative. He will explain the advantages of having your steel Slit, Sheared, and Edged by our expert staff. Contact him today, or write for information about this phase of our Specialized Steel Service.

COLD ROLLED STRIP STEEL • COILS AND STRAIGHT LENGTHS • SHEET STEEL • COLD FINISHED BARS • SHAFTING • ROUND EDGE FLAT WIRE • ROUND WIRES • TEMPERED AND ANNEALED SPRING STEEL SHIM STEEL • FEELER GAUGE • DRILL ROD • STEEL BALLS

GENERAL STEEL WAREHOUSE CO., INC.

1830 N. Kostner Avenue, Chicago 39, Illinois

Belmont 4266

New York 17 441 Lexington Ave. Vanderbill 6-2750 Cincinnati 17 56 E. Mitchell Ave Plaza 1470

Milwaukee 2 208 E. Wiscansin Ave. Broadway 7629 SI, Louis 5 9301 Banhamms Faad Wydawn 1369 Minneapolis 11 100 17th Ave., North Cherry 4457

THERMAL REQUIREMENTS Por Plast Durnace Operation



Weight of moisture per ton of iron said to be most accurate indicator of effect of blast moisture on fuel economy. Heat generation, consumption and losses in the three iron producing districts are analyzed in this the third of a series of four articles

By CHARLES E. AGNEW

Consultant
Blast Furnace and Sintering Plant
Operations
Claveland

DATA on the South, North, and East operations, shown in Table VI, present some interesting sidelights. The discrepancy in the volume of air indicated from the blowing equipment speed and the amount indicated from the gas analysis and weight of carbon consumed probably occurs more often than is generally recognized.

Volume of air blown in the South and East operations, indicated by the carbon combustion calculation, are reasonably close but the South working volume of the furnace is only 71.4 per cent of the East working volume. Inevitably the velocity of the gases in the South shaft operation would be much greater than that of East and the effect of the gas velocity upon flue dust production is shown in the data to follow, where cent greater than that of East, despite the large amount of fines in the East burden.

Grains of moisture per cubic foot of air is less in the South than it is in the North or East. East was purposely calculated the same as North to show that the grains of moisture per cu ft of air is not as accurate an indicator of the effect of blast moisture upon fuel econcmy as the lb of moisture per ton of iron. Grains of moisture per cu ft of air and the number of cu ft of air per min determine the lb of moisture per min but the lb of moisture per ton of iron are determined by the number of min it takes to produce a ton of iron. Grains of moisture in South are only 67.9 per cent of that of North but the lb of moisture per ton of iron is within a lb of each other (see later data) and while North and East are the same in grains of moisture per

Molten slag being flushed into a cinder thimble

cu ft of air he lb of moisture per ton of iro in East is only 69.0 per cent that of North Effect of these differences upon hea consumption in the furnace operation i a possible contributing cause for the difference of opinion among operators regarding the value of air conditioning.

Difference in percentages of the weigh of coke burned at the tuyeres supports th statement made by Richards (9) that the heavier the burden the lower the per centage of coke burned at the tuyere Respective percentages shown were de termined from Johnson's (1) procedure that the weight of coke burned at the tuyeres is simply three-fourths the weigh of the oxygen carried in the blast an the blast moisture. This weight was use in relation to the fixed carbon content of the respective cokes. The indicated cor dition appears to be logical since th heavier the burden the more oxygen will contain, and, since reduction of the oxides occurs above the tuyeres, the re leased oxygen must satisfy itself wit carbon before the coke arrives at the

The outstanding observation on the data in Table VII appears to be the larg difference in the total weight of meterials charged into the three furnace to produce the same weight of pig irouthe weights of South being respective 1.36 and 1.76 times greater than Normand East. The cause is of course in the iron content of the materials, the amount of stone to flux the gangue, and the amount of air required to burn the weight of coke used.

The high percentage of ash in the South coke is undoubtedly an important factor in the burden ratios carried. Nor and East having comparable coke are als comparable in the total burden carried the advantage being with East because of the richer ore mix and lower stor requirements. The actual difference is the burden ratios is even greater that indicated by the figures because the burden delivered to the bosh, aside from

Negative Photostat

⁽e) All footnotes are presented at the end

lue dust produced, is always the charged weight minus the volatiles volved with gases. The totals of the noisture and combined volatile matter of the three ore mixes are as follows:

Ossible max burden wt delivered to bosh 86.00 88.00 98.20

Assumed as representative of Lake ores.

The advisability of considering pounds of moisture per ton of iron rather than rains of moisture per cu ft of air is adicated in Table VIII by the respective veights of moisture per ton of iron.

The data of South⁽³⁾ is shown for one cross ton of iron, without scrap, while he North and East calculations include crap, which accounts for no scrap being hown for South in this comparison. The hermal data to follow are however based pon 1 gross ton of iron in all three calculations.

Advantage of the richer ores is relected in the yield of pig iron and in the lb of slag produced. It is unfortunte that there is not any slag analysis flown in the North data. The Bru figures, for lb of iron and slag, used in the lorth calculation were assumptions ased upon previous tests made under miliar conditions and undoubtedly serve the purpose satisfactorily. However, the 10 and 900 Btu used respectively per to for iron and slag indicate that the lag chemical composition must have een similiar to that of East, which by alculation is 512 and 888 Btu respectively.

Slag analyses shown for South and ast have been calculated to their silicate omposition in a manner similiar to that sed in a previous article (6) and the temeratures calculated from the silicate omposition. It is of interest that the outh slag temperature observed by optial pyrometer is checked within 7°C by ie temperature calculated from the silicte composition and indicates that for ractical purposes the temperature deermined from the slag analysis is satisactory. Slag data presented in the preiously mentioned article indicated that slag of the South chemical composition rould not be favorable to the concentraon of heat in the lower bosh of the irnace and may well have been a conibuting factor to the low burden ratios nown in the South data.

Carbon content of the flue dust is a ariable in any furnace operation. The igh content of South is probably inuenced by the volume and velocity of ne gases through the shaft the same as ne flue dust production undoubtedly as. North is reasonably representative good Lake ore practice. The 10.00 per ent of East was used as representative then a high percentage of raw concentees are used. With small percentages fines in the burden the author has re-

TABLE VII—MATERIALS	CHARGED	INTO	FURNACE	TO	PRODUCE	1 GT	OF	IRON
					The of Mar	Loui-1		

		—— I.b of Material —	
	South	North	East
Ore	4203.60	4057.00	3450.00
Coron			350.00
Scrap	328.98	36.00	
Limestone	1253.11	795.00	300.00
Coke	2626.85	1682.00	1350.00
Blast (excluding moisture)	9627.88	6673.00	4548.00
Moisture in blast	67.92	69.00	47.60
	18108.34	13313.00	10045.60
Data on materi		10010.00	20010.00
Avg. Fe in ore, %	43.28	51.19	54.55
Avg. Fe in ore and scrap, %	48.31	51.22	57.35
Fluving stone	Dolomite	not known	Calcite
Fluxing stone	Dolomite	not known	Calcite
	1.00/1.00	.2.41/1.00	2.55/1.00
	1.60/1.00		
Ore and scrap to coke		2.44/1.00	2.78/1.00
Ore, scrap, and stone to coke	2.20/1.00	2.91/1.00	3.00/1.00
Coke analysis; (Dry)			
Volatile matter, %	0.49*	1.35	0.50
Fixed carbon, %	84.93	89.00	90.00
Ash, %	13.48	9.40	8.65
Sulphur, %	1.07	.59	.85
	99.97	100.34	100.00
Moisture, %	5.40	2.30	3.00
Temperature of blast, °F	957	1248	1550
	001	2=10	

^{*} Adjusted from natural as reported(3)

covered flue dust which by actual analysis contained 24.00 per cent carbon.

Temperature of the top gases are comparable but the conditions under which the temperatures were produced are not. Reference to the weights of materials charged and discharged at the respective furnaces will show that South and North charged into the furnace with the stock 550 and 600 per cent more moisture than East, This phase of the operation will be discussed later.

A cursory glance at the heat produced figures in Table IX would indicate that the conditions of heat production are comparable in the three operations, with the exception of the reversal of the percentages of heat produced from CO and CO₂ between South and North and East, but a close analysis of the data from which the figures were derived discloses a vast difference in those conditions. By weight the gas analyses of the three operations are shown in Table X.

Since the carbon gas leaving the coke combustion zone of the furnace (8, 10) is virtually all CO the net amount of CO₂ in the gas leaving the top of the furnace, exclusive of that derived from the burden, appears to be a more accurate indicator of the efficiency of carbon gas reduction of iron oxides than the ratio of CO to CO₂ which is commonly used. Further influence of the effect of the net amount of CO₂ in the top gas is indicated by the relation between the amount of heat produced and the weight of gas which produced it. The amount of

heat produced by North and East is respectively 86.2 and 72.9 per cent that of South while the weights of gas which produced the heat are respectively 70.7 and 50.0 per cent.

In a like manner amounts and percentages of heat brought into the furnace with the dry blast are misleading in their indication of the conditions with which the heat was brought in. While the amount of heat brought in by North and East respectively is 90.3 and 76.5 per cent that of South it was brought in with a weight of blast which was respectively only 69.3 and 47.2 per cent. While the weights of moisture in the blast are within a lb of each other in South and North the moisture in East is only 68.6 per cent of that weight. With virtually the same weights of moisture North brings in 1.3 times as much heat as South, while East, with only 68.6 per cent of the weight of moisture of North and South, brings in 86.1 per cent as much heat as North and 1.13 times as much as South. These seeming discrepancies are simply reflections of the differences in blast temperature. The advantages of the lesser weights of air and gas to fuel consumption are reflected in the heat consumption data which follow.

Heat consumption: In the data showing the lb of material charged to the furnace, South and East use a comparable weight of scrap while North used little. Pounds of Fe per ton of iron were calculated from the stages of oxidation:

TABLE VIII—MATERIALS DISCHARGED	FROM FU	RNACE	PER GT OF	IRON
	South	— Lb	of Material —— North	East
Pig iron Scrap	2,240.00		2,240.00 22.00	2,240.00 67.00
Sieg	none 1,786.47		1,010.00	898.00 90.00
Flue dust Gas (excluding moisture) Moisture in gas	277.86 13,244.89		89.00 9,359.00	6,622.00
Moisture in gas	559.12		603.00	106.00
The control of the co	18,108.34	. :	13,314.00	10,023.00
Yield of pig iron and scrap, %	al discharged	1	_ 55.26	60.71
Pig iron analysis:	South		Per cent	East
Silicon	2.01 0.044		1.35 0.032	1.00 0.030
Sulphur Phosphorus	0.603		0.071	0.300
Manganese Carbon	0.722 3.60		0.74 4.20	1.50 4.00
Iron	93.02		93.61	93.17
	100.00		100.00	100.00
Temperature of pig iron: Observed with optical pyrometer, °F	2525			
Observed with optical pyrometer, °F Calculated from slag analysis, °F Calculated from Btu indicated, °F		~	2642	2652
Sing analysis:	32.15		-Per cent	35.03
SiO ₂ Al ₂ O ₃ CaO	16.23		analysis	14.51
CaO MgO Sul	32.29 15.88		not known	42.99 4.52
Sul	1.41			1.78 1.17
Misc.	2.04			
Calculated to silicate composition as indicated	100.00			100.00
by McCaffery chemical composition diagrams: 100.00% oxides:			Per cent-	
SiO ₂	33.31			36.09 14.95
$egin{array}{c} \mathrm{Al_2O_2} \\ \mathrm{CaO} \end{array}$	16.81 33.44			44.80
MgO	16.44			4.66
Viscosity @ 2732* F (number of poises)	100.00			100.00 4
Tetrahedron number	16			6
Compounds M	elting		Per cent -	
Akermanite 1	np, °C .458	South	North	East 31.51
Tricalcium disilicate	475 498	41.73		12.21
Calcium bisilicate	540	41.70		16.05
	.551 .567	29.16		
Gehlenite	590 2130	28.35		40.21
Magnesium oxide	650	0.73		
		99.97		99.97
Calculated free running temp. based on percentage principal constituents, ° F Observed with optical pyrometer, ° F. Calculated from Btu indicated, ° F	s of four	2556		2700
Observed with optical pyrometer, * F.		2568	2732	/
		15.07	8.25	10.00
Carbon in flue dust, %			Per cent .	 ,
Carbon monoxide		30.04 9.78	23.50 14.90	28.00 14.50
Methane Hydrogen		2.17	.20 4.10	.50
Nitrogen		58.01	57.80	57.00
		100.00	100.00	100.00

	——— I	b of mater	ial
	South	North	East
Fe (scrap)	328.98	39.00	283.00
FeO	160.50		
Fe ₂ O ₃		1893.00	48.84
Fe ₈ O ₄		165.00	1552.83
Fe silicate			200.33
	2084.00	2097.00	2085.00

Use of scrap reduces the amount of Fe which must be reduced from oxides consequently North shows a greater consumption of heat for iron oxide reduction than either South or East even though the pounds of Fe in the pig iron are virtually the same in all three cases. The interesting observation is therefore the number of Btu per lb of oxides rather than the Btu per ton of iron.

Iron: In pig, lb In scrap, lb	South 2084 329	North 2097 39	East 2085 283
From oxides,	1755	2070	
Btu consumed: Per ton Fe for	1755	2058	1802
Fe oxide reduction5,5	77,086		5,358,917

Per lb of Fe			
oxides	3,177*	3,218	2,973

* Derived: 5,577,086 ÷ 1755

South and North are virtually the same per lb of oxide because the oxides of those calculations were largely hematite (Fe₂O₃), at 3240 Btu per lb of Fe, while East was largely magnetite (Fe₂O₄), at 2970 Btu per lb of Fe.

Burden data of South⁽⁶⁾ show 1000 lb of nodules (25.0 per cent of ore burden) containing 20.61 per cent FeO which is teasonably comparable in lb of Fe to the lb of Fe in the sinter and slag silicates of East. Neither South or North shows any iron silicates while East shows 10.0 per cent.

If the 1552.83 lb of Fe from the magnetic oxides (Fe_3O_4) of East, calculated at 2970 Btu per lb of Fe, are calculated at the hematite (Fe_2O_8) requirement of 3240 Btu per lb of Fe, the same as South and North are calculated, the heat

consumption is increased 419,254 But per ton of iron. This is an increase of 7.5 per cent in the requirements for iron oxide reduction, which is only 3.9 per cent of the total Btu produced in Eastanglighte amount in view of the large available surplus of heat in the unaccounted for Btu. With the same reasoning the silicates of East could be a part of the South and North iron origin without materially influencing the amount of heat consumed in the reduction of iron

With all these various combination of materials and states of existence of the iron there is little difference in the total amount of heat consumed in the reduction of the iron, and that the slight differences between the theoretical requirements of heat for the reduction of the various oxides are of more academic interest than they are of practical, or commercial, importance.

Heat consumed in the reduction oxides containing the manganese, phophorus, and silicon, of the three balances are directly comparable when compared to the percentages of those elements in the pig iron. The influence of alloyed elements upon heat consumption is illustrated in Table XI.

Obviously the amount of heat consumed in the calcination of carbonate will always be determined by the amount of carbonate to be calcined. South no only has a much larger weight of lime stone than either North or East but part of the ore mix also contains carbonate. The effect of this larger percentage is reflected in the relative heat consumption of the three operations.

Johnson (a) calls attention to a discrepancy between the amount of moisture dissociated in the North heat balance and the amount of hydrogen (H₂) in the gas analysis upon which the North calculation was based. Equal pounds a blast moisture in the South and North data in relation to the Btu consumption calculated for moisture dissociation in dicate some error in the calculation.

Amount of heat carried off with the ground in the three calculations is comparable, the slight difference being due to the temperature of the slag, which determines the temperature of the iron However, the amount carried off by the slag varies considerably and is due to the difference in the pounds of slag per to of iron as well as to difference in temperature. Converting the Btu per ton ciron figures to per lb figures we have

Heat taken from			1
furnace:	South	North	East .
Btu per lb Fe	485	510	512
Btu per lb	840	900	888
Ratio of heat loss:	70/1.00	1 70/1 00	1 70 /1 6

Data of the South calculation record the temperature of the iron and slag a observed with an optical pyrometer and as checked by calculation based upon the



OF METAL MELTING



Economy through close control during the entire melting process is another feature of Lectromelt's outstanding economy. The patented counterbalanced electrode arms and the friction bite winch system make possible the most rapid and sensitive electrode control.

Result — greatly reduced electrode consumption and breakage — more economy.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH 30, PENNA.

123

Heat Produced	Sou Btu	ıth 🧳	Nor Btu	th or.	Btu Es	ast or.
Combustion of C to CO. Combustion of C to CO ₂ . Heat in blast (dry). Heat in blast moisture	7,371,759 d 4,784,637 2,284,689 31,850	51.55 33.10 15.70 0.20	3,995,000 6,754,000 2,057,000 42,000	31.10 52.60 16.00 0.30	3,273,857 5,496,236 1,748,251 36,152	31.0 52.0 16.5 0.6
Heat Consumed	14,472,935	100.00	12,848,000	100.00	10,554,496	100.0
Reduction of iron Reduction of MnO, P ₂ O ₅ , SiO ₂ Calcination of carbonates Dissociation of moisture Carried off with iron Carried off with slag Carried off with gas (dry) Carried off with gas moisture	5,577,086 825,832 1,176,470 1,030,464 1,086,400 1,500,632 1,083,650 651,819	38.40 5.70 8.10 7.20 7.50 10.40 7.50 4.50	6,623,300 483,900 702,000 397,000 1,142,500 909,000 752,400 700,100	51.50 3.80 5.50 3.10 8.90 7.10 5.90 5.40	5,358,917 492,637 247,050 274,176 1,146,880 797,424 574,692 125,427	50.7 4.6 2.5 2.5 10.8 7.5 4.1
Total heat accounted for Radiation, cooling water, and unaccounted for	12,912,353 1,560,582	89.30 10.70	11,710,200 1,137,800	91.20 8.80	9,017,203 1,537,293	85.4 14.5
Total	14,472,935	100.00	12,848,000	100.00	10,554,496	100.0

TABLE X—GAS	ANALYSES	BY WEI	GHT OF THE	REE OPER	RATIONS	
	So	uth	No	rth	Eas	st
Gas	lb	%	lb	%	lb	%
CO	3,868.85	29.21	2,098.42	22.40	1,719.07	25.96
CO ₂		14.74	2,087.06	22.30	1,399.23	21.13
<u>С</u> н		'A' 4 F	9.36	0.10		0.03
H ₂		$0.15 \\ 55.90$	28.08	$0.30 \\ 54.90$	3.501.71	52.88
N ₂	7,403.86	55.90	5,138.91	54.90	3,301.71	32.00
	13,244.89	100.00	9,359.83	100.00	6,622.00	100.00
Lb CO2 from carbonates in			ŕ			
burden (no heat produced)			384		135.	
Net lb CO2 producing heat			1,703		1,584.	
% CO ₂ producing heat	9	.11	18	.19	19.	.09

slag silicate composition. (See slag analysis data, Table VIII), The Btu data of North are shown as recorded and the temperatures being determined by proportional calculation. The temperature of the East slag was determined from the slag silicate composition and the iron temperature by calculation maintaining the same relation of temperatures between the iron and the slag as that which had been determined by optical pyrometer in the South data. It is obvious that the amount of heat taken from any furnace by the iron and slag will vary with the weight of slag in relation to the weight of iron, and to the chemical composition of the slag because the slag chemical composition determines its temperature. The slag analysis for South and East are both virtually neutral in their acid/base ratios and as previously stated the slag of North must have been comparable to East. The East slag is within the chemical composition range indicated by calculation as discussed in a former article (5) and actual practice to be ideal for concentration of heat in the lower bosh of the furnace. In the theoretical calculations referred to, the degree of heat concentration was indicated by the slag temperatures but since temperature is a measurement of intensity but not volume of heat the lb of coke needed per lb of slag to maintain the desired degree of intensity of heat is the important commercial consideration.

Heat required to form slag is considered to be the total of the heat consumed in the calcination of the carbonates plus that consumed in the fusion and maintaining the slag to its free running temperature. Calculated values are given in Table XII. From the calculation it is apparent that aside from chemical composition the amount of coke required to form 1 lb of slag will vary with the carbon content of the coke and the amount of carbonates which must be calcined. East, with the free CaO of open-hearth and ferromanganese slags maintains the same intensity of heat (slag temperature) in the furnace bosh as North (similiar slag compositions indicated) but does it with only 71.9 per cent of the North weight of coke per lb of slag, with only 1.00 per cent difference in the fixed carbon content of the two cokes.

Temperature of the top gases are reasonably comparable, consequently the difference in the amounts of heat taken from the respective furnaces is determined by the difference in the weights of gas. Per lb of gas they compare as follows:

 Gas (dry), lb
 13,244.89
 9359
 6622

 Moisture in gas, lb
 559.00
 603
 106

 Bit taken from furnace:
 Per lb gas (dry)
 818
 804
 867

 Per lb moisture in gas
 1166
 1161
 1183

Obviously the gas temperatures of South and North are as low as they are because of the large amount of moisture contained in the gas. This moisture is not of any importance to the fuel economy of the furnace because again obviously if was not there the gas temperature would simply be higher. It is the gas rising from the furnace shaft which supplies the heat used in the evaporation of moisture added with the stock and consequently the important consideration from the commercial view-point of conservation of heat lies in the weight and temperature of the gas rising from the furnace shaft. A rea-

sonable amount of moisture vapor in the gas is an advantage to subsequent gas cleaning operations provided adequate equipment is available for condensing it but the use of water expressly to control top temperature to a safe working temperature must be recognized as a sacrifice of heat, even though commercial considerations may justify the sacrifice. The East top temperature is just as safe as South or North but the conservation of heat, indicated by the savings in Btu compared to South and North, and the application of that heat to productive work in the lower regions of the furnace is reflected in the heavier burden carried and in the lower fuel rate.

Percentages of heat generated which is accounted for in the three calculations are reasonably comparable. The accounted-for-percentage of East appears low but if to it there is added a proportionate amount of Btu for moisture evaporation in the gas, as used in South and North or the difference for Fe2O3 and Fe3O reduction, the accounted-for-percentage of heat checks both South and North very well. In the three operations the amount of thermal work performed in effecting the chemical reactions entering into the pig iron production are virtually the same in all. Difference in fuel rates between the operations is due to the difference in the amount of thermal work performed in effecting the chemical reactions entering into the associated operations of gangue removal.

All other things being equal the amount of heat lost by radiation and cooling water will vary with the size of the furnace. The uniformity in the amount of heat lost and unaccounted for in the three operations analyzed, with their marked difference in the total amount of heat required by the respective raw materials, suggests the thought that possibly there is a reasonably constant amount of heat which is common to any and all blast furnace operations which acts as a balance wheel between the shaft and the bosh and hearth operations. Since the per lb heat require



This new booklet tells . . .

What every alloy steel user should know

HERE'S a reference book that can be as helpful to every user of alloy steel as the indispensable "Classification of Extras".

Its 68 pages present a quick picture story of the resources which make The Timken Roller Bearing Company an outstanding source of fine alloy steels. It describes the melting, drawing, hot rolling, annealing and other facilities that give our specialty mill the flexibility needed to produce alloy steels to meet a variety of needs. And it lists the complete range of available sizes, analyses and finishes of Timken steel products.

Send for your copy of the booklet, "Timken Steel and Tube Division, Facilities and Products". There's no charge. Just address your request on your firm's letterhead to Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.



larch 17, 1947

1.45

TABLE XI-INFLUENCE OF ALLOYED ELEMENTS ON HEAT CONSUMPTION

	South		North		East		
Silicon reduced	1b 45.02 16.17 13.51	% 60.27 21.64 18.09	29.10 16.80 1.60	% 61.26 35.37 3.37	22.40 33.70 16.73	% 35.65 53.64 10.71	
	74.70	100.00	47.50	100.00	62.83	100.00	
Btu consumed: In reduction Per lb of oxides	828 1	5,832 1,055*		,900 ,187	492, 7,	637 841	

*Derived: 825,832÷74.70

TABLE XII—HEAT REQUIRED TO FORM SLAG						
Heat consumed calcinating carbonates, Btu Heat removed by slag, Btu	South	North	East			
	1,176,470	702,000	247,050			
	1,500,632	909,000	797,424			
Total Slag, lb Btu/lb slag F.C. in coke, % Btu/lb coke burned C to CO ₂ @ 14,543 Btu/lb C Btu available (C combustion 1/3 efficient in fur-	2,677,102	1,611,000	1,044,474			
	1,786	1,010	898			
	1,499	1,596	1,163			
	84.93	89.00	90.00			
	12,651	12,943	13,089			
nace) Btu required/lb slag Btu available Lb coke/lb slag	4,217	4,314	4,363			
	1,499	1,596	1,163			
	4,217	4,314	4,363			
	0.355	0.370	0.266			

ments for the raw material constituents are apparently well defined and constant in their demands the opportunity for improving the fuel rate of any given operation lies in the amount of heat which can be recovered without disturbing the amount required for the balance wheel.

That the total heat requirements for

any operation can be lessened by con centration of the iron in the raw m terials and by lowering the percentage of coke ash is clearly indicated by the comparison of the heat balances presente in this article, but a difference in the fuel rate for an operation using the san materials, such as the 1350 lb coke po ton of iron shown in East and the 129 lb referred to earlier in this article ca come only from more efficient recover of heat because the coke unit per charg remaining the same no greater amount of heat could be generated, other than h greater CO to CO, combustion within the furnace.

(To be continued)

(1) "Principles, Operation, and Products of the Blast Furnace," by J. E. Johnson Jr.
(3) Paper No. 391, Bureau of Mines, by S. Kinney, P. H. Royster and T. L. Joseph.
(5) "Principles of Iron Ore Beneficiation STEEL, Nov. 26, Dec. 3, 10 and 17, 1945.
(9) "Metallurgical Calculations," by Prof. J. Wickbards.

Richards,
(10) 'Blast Furnace Stock Column," Bureau Mines Technical Paper No. 442.

Storing Engineering Material

(Continued from Page 106)

department, it is logical that such materials be stored where they are used. This prevents indiscriminate use of expensive tool steel for other work,

Where production schedules fluctuate widely and where jobs are often halted during the production cycle, separate areas are set aside for storage of semifinished parts. Since these parts are only partially machined, they are neither finished parts nor are they considered properly as castings or forgings. They are segregated in a special area and issued into the shop to fill new orders or merely held in abeyance until the cancelled or delayed job is reinstated.

Another widely used system is that of departmental stores. Here, materials required in departments are stored in adjacent areas. Materials are delivered directly to this area from receiving. Such a system entails the maintenance of larger stores personnel. However, where production is of a steady, nonfluctuating nature, this system has proved to be quite satisfactory.

Layout of the storesroom is quite important in good stores operation. Racks containing tons of materials are rarely juggled around, nor for that matter, is there usually much space in plants for expansion of stores areas. However, within this set stores area, changes, improvements, and modifications can be made.

Empty spaces between tops of racks and the ceiling are waste spaces and in many instances can be utilized for storing materials. Note in Fig. 10 how the top of the rack is utilized for storage

of other materials. Skid-bins piled a-top regular racks are another means of utilizing fully all space in a storesroom. Such skids are racked and removed by means of fork truck or high-lift platform

Ample aisle space for material handling devices and their loads is a prime necessity in all storesrooms. If aisles can not be widened enough to permit the passage of trucks, overhead hoists mounted on trolleys should be installed.

The layout should be such that material movement from stores to other departments is a smooth one. Incoming materials should be segregated in one area; outgoing materials in another. Separate receiving and shipping depots in the storesroom eliminate confusion between the two types of materials.

Supplementary Storage Space

Supplementary storage space in the yard or in the plant should be available during periods when the storesroom is heavily loaded. Hot rolled bars, castings and forgings, plates, and other materials that are not effected adversely by the weather can often be placed temporarily on skids or dunnage in the yard.

Selection and use of racks, bins, shelving, and other means of storing engineering materials is an individual company problem. However, such selection and use of storage facilities must be based on certain basic principles,

In most plants several types of racks will be required because no single rack can store all types of materials. article will not attempt to catalog all the different types of racks; instead, the broad classifications will be presented and individual factors pertinent to each type will be discussed.

Pigeon hole racks, shown in Fig. 4. and 8, can be made from shelving, met pipe, wooden planks, welded lengths structural steel, and many other many terials. Outstanding points of this store age method are indicated by the arrow on Fig. 5. These include: (1) Bars at staggered in racks for ease in remova (2) identity of each bar is indicated of rack markers and each strip tells th heat number, size, type, and heat trea ment of the bars in the rack; (3) k cation of each part of the rack is ind cated by location numbers and letter thus, each individual portion of the rac is identified by a numerical-alphabetic symbol; (4) various sizes and shape are stored in the same section, this possible because the location of eac bar in the rack is recorded and known Finished parts, castings, forgings, bar tubes, and almost all other types of me terials can be stored in these racks. The main disadvantage lies in the fact that four sides are closed. . .materials can l pulled out only from front of rack.

A variation of this type of rack is th Goldberg, shown in Fig. 11, which has one side open to permit removal materials from the side. Features of th storage "system" are pointed out by nun bered arrows on the illustration. Thes features are: (1) Ends of bars are painte with identifying colors, different colo schemes are used to indicate types an grades of metal: (2) length in feet an inches painted on face of bars: (3) dian eter in inches painted on face of bal (this procedure is not followed consistent ly in the illustration because dimension



are painted on cross-beams of rack); (4) thickness dimensions are painted on crossbeams of the rack; (5) bars are outside of the rack far enough to permit ease in handling and removing bars; (6) type of metal is indicated on the rack; (7) cold finished stock stored on top of the rack; hot rolled stock in the rack, similarly hot rolled and cold finished bars of the same specifications number are stored in separate racks; (8) location of each section indicated by location number painted on the rack (location numbers in this photograph are obstructed from view by angle of bars); (9) overhead crane services all sections of the rackpermits rapid removal of bars from rack.

Upright or vertical racks are illustrated in Fig. 6 and 7. Lighter metals such as aluminum and magnesium as well as smaller diameter steel bars are stored in such racks. Heavier metals such as steel plate are stored in the type

of vertical rack illustrated in Fig. 2. The advantages of these racks are: (1) Conserve storage space by using to the fullest the head room in the stores department; (2) they are easily accessible to material handling devices and to material movers.

Load Spindles Evenly

Spindle racks are designed for bars, tubes, and long parts. In using this type of rack care should be taken in having the spindles loaded evenly. Loading one side and leaving the other empty is dangerous because any jolt or jar will cause the rack to topple. In placing batches of bars on such racks, care should be taken to avoid having short bars on the bottom of the pile, such bars will drop and possibly cause damage.

Storing on dunnage is shown in Figs. 1 and 3. Prime advantage of this type of storage is the low cost—racks need not be purchased, a few lengths of wood

or metal are required. The great advantage is that only the top row of bars in each pile is directly accessible. Because of this, each pile should contain the same size and type material. Square and flat stock can be stored on dunnage without side supports because the bars will not move or roll; however, when round stock is stored in this manner, steps should be taken to prevent the bars from rolling. This can be done by (a) wiring bars into bundles, (b) blocking ends of the planks on which the bars rest, or (c) inserting lengths of wood or metal between piles.

Storing in skid-bins is an inexpensive means of storing castings, forgings, and even some finished parts. Materials are placed in such skids, skids are piled one on top of the other in storage. When materials are requisitioned, material is moved to the shop in the same skid used for storage.

Bright Copper Plating

(Continued from Page 108)

for ordinary copper plating.

Although there are minor variations, depending on operating factors, the following is a standard solution formula:

Copper cyanide 6 oz per gal
Potassium cyanide 9 oz per gal
or
Sodium cyanide 7.5 oz per gal
Caustic potash 2 oz per gal
Rocheltex 6 per cent by volume

MacDermid bright copper makeup 2 per cent by volume Analysis of Solution:

Rocheltex 5 to 8 per cent with 6 per cent preferred

Normal operating conditions: Temperature

0.0005 copper in 15 min at 20 amp
Agitation

Cathode movement of 20 fpm or
more; or agitation directed to the

cathode
Efficiency100 per cent

Solution is filtered using ½ to 1 lb of filter aid per 100 gal of copper solution until clear. Addition of Rocheltex promotes greater anode efficiency, increasing current density. Brilliant copper deposits are obtained directly from the solutions, particularly adapted as an undercoating for other metals, including

nickel and chromium, normally plated over copper.

Simplicity marks operation of the solution and controls; in effect a modified cyanide-type copper solution is used to which is added the additional agents, Rocheltex and MacDermid bright copper makeup. For all standard ingredients, conventional methods of analysis are employed; limits on all ingredients are wide and consumption of chemicals low. Temperatures can vary considerably without ill effect, plating process operating as it does at low temperature.

With most cyanide-type plating solutions it is generally possible to convert them by a simple treatment, producing results equal to those obtained from a new solution. While potassium salts are favored as a base, sodium salts can be employed or a combination of the two, with but slight decrease in efficiency, mixtures producing proportional results.

Rather high plating speeds are achieved at moderate current densities, since the plating is reported to operate at 100 per cent efficiency and copper is plated from the monovalent state. Deposition of 0.001-in, of copper requires but 30 min plating time at 20 amp per sq ft, a commonly used current density, corresponding closely to bright plating of other metals. Even higher plating speeds are possible with special solution additions and methods. A noteworthy characteristic of the solution is ability to place smooth deposits even in comparatively dirty solutions.

This is especially important since rough deposits make for hard buffing, lower the corrosion resistance and detract from appearance. Low operating temperatures and high efficiency make the cyanide breakdown unusually low,

more than balancing cost of additional agents, and resulting in low operational cost; pH of the solution is maintained by addition of caustic potash, relatively inexpensive.

Copper metal content is maintained by corrosion from the anodes, ordinarily 100 per cent; thus only dragout losses need be made up by additions of copper cyanide. Addition agents are extremely stable; a few quarts per 1000 gal per day are sufficient for maintenance.

Any conventional type of anode may be used. Rolled and cast slab anodes, ball anodes or electrolytic slabs are equally satisfactory. For high anode efficiency, however, it is important to keep the anode area as large as possible; twice the maximum cathode area preferably. Current densities being within common operating ranges, regular low voltage current sources are applicable; since common operating voltage is about 1.5 v, power cost is low.

Other than normal care exercised in cleaning metal parts for bright nickel plating, no special cycles for cleaning or rinsing are necessary. As in all plating, however, cleaning is important since poor cleaning definitely affects the bright range and adhesion as the copper is plated at 100 per cent efficiency. No strike solution prior to the bright copper plating process is normally required, but for deeply-recessed parts this is advisable. When necessary, the bright copper solution itself can be used for the strike using a 6-v potential either in the same or separate strike tank.

In this process, while an extremely high current density can be used up to 5 min, brilliance of the deposit can be restored by dropping to the bright cur-

KNIFE CLEARANCE Easily Adjusted FOR ANY THICKNESS...



THERE is a direct relation between thickness of plate cut and clearance between knives for ost satisfactory results. To properly set this clearace when changing from one plate thickness to other has been made extremely simple in Steeleld Shears.

The need of moving the shear bed, adjusting arious nuts, testing the knife clearance with feels, etc., has been eliminated. Such bothersome, ne-consuming work has been reduced to the ere turning of a convenient crank. A large dial dicator indicates the clearance in thousandths of a inch and also shows the plate thickness that ay be cut for any knife setting. Because knife ljustment has been made so easy, operators illingly make it on Steelweld Shears and thereby

get the best possible cuts for every plate thickness—and knives remain sharper for longer periods.



GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7801 EAST 282ND ST.

WICKLIFFE, OHIO.

STEELWELD PINOTED SHEARS



rent density range and continuing the plating.

Prior to another plating operation after bright copper plating no special treatment is required; cold water rinse is generally enough except for deeply recessed parts and those with blind holes. For these, two cold water rinses, with a 5 per cent sulphuric dip between, is recommended.

Plating equipment for the process includes an ordinary steel tank and steel heating coils with cathode rod or solution agitation. Periodic filtration is only necessary in accordance with usual practice employed in bright nickel plating. Continuous filtration is not required, but no loss of brightness occurs even if continuous filtration through carbon is employed. Normal tank voltage is 1 to 2 v, and usually a 4 to 5-v drop rheostat is used. Rheostats of standard design or standard regulation of generators or rectifiers are satisfactory.

Summarized advantages claimed for this bright copper plating process include mirror bright deposits obtained directly from the bath; low brightener consumption; simple steel equipment used throughout; any conventional type copper anodes can be used; operation performed at low temperature and with low metal concentrations; most standard cyanide copper baths can be converted by adjusting formula and adding brighteners; water rinse only operation required after plating and prior to other plating processes, such as bright nickel or chromium; operates at 100 per cent efficiency and plates monovalent copper; main copper bath can be used as a strike, although no strike is normally required; dull burnt deposits can be brightened by reducing current to normal bright current density range; excellent adhesion and throwing power with wide bright plating range; and ease of buffing when desired or required.

Superheater Devices Warn Naval Cruiser Personnel

Navy's Baltimore class cruisers, of which the U.S.S. Toledo is one, are equipped with electronic superheater devices that warn firemen when steam flow becomes dangerously low,

Manufactured by Bailey Meter Co., Cleveland, each device consists of an electronic transmitter connected electrically to an electronic indicator. Transmitter is connected to the superheater inlet and outlet headers, thereby measuring the pressure drop through the superheater. It then transmits this measurement to the indicator, enabling the firemen to take the necessary steps to save the superheater from damage.

Better Machining Methods

(Continued from Page 97)

grains, which is very distinct in this picture, is the plane of shear. These two ideas were used by Merchant' in developing an analysis of the mechanics of cutting.

Since the cutting of a metal involvés a shearing action, it is plain that the shear strength of the metal is an important factor in the power required from the machine tool to remove a given quantity of metal. This is the reason why aluminum and copper, which have a lower shear strength than steel, require less power per cubic inch of metal removal.

A photomicrographic study of cast iron led to important conclusions relating the microstructure of the workpiece to tool life. Field and Stanbury⁵ concluded after a long series of tests that, in the carbide milling of cast iron, the microstructure—not the chemical analysis or physical properties—is the major factor governing tool life. Photomicrographs showing the microstructure of a few of the cast irons tested are given in Fig. 4.

Equal Tool Life

It was found in this investigation that the similar structure of the cast irons identified as C-304 and C-309 in Fig. 4 resulted in equal tool life even though the chemical composition was different. On the other hand, cast iron C-304 A, though having a chemical composition identical with the C-304, gave longer tool life. Of the four cast irons shown in Fig. 4, the one made up entirely of pearlite and graphite (A) gave the best tool life.

A similar study of the microstructure of steels may be made to relate the abrasiveness of their structure to tool life; it is well known that oxides, silicides and hard carbides in the steel reduce the life of the cutting tool markedly. The presence of these abrasive constituents can be detected in photomicrographs.

Photographic records of the microhardness distribution in chips and machined surfaces were very helpful in the study of another source of poor tool lifenamely "induced abrasiveness". (This erm refers to the increased hardness of he chip, builtup edge and work surface esulting from the severe work hardenng of the metal by the cutting process.) Merchant and Zlatin have found that ragments of the builtup edge which are carried off by chips and machined jurfaces are extremely hard. Note Fig. 5. The hardness values given here are mown as Knoop numbers. These are obained by measurement with a Tukon ardness tester, the diamond-shaped narks being the impressions made by he indenting diamond of this device. In he present case these values indicate



... With This "Dirt-Dynamiter"

The OAKITE-VAPOR Steam Cleaning Unit

AT the flick of a switch—anywhere...anytime, vibrationless two-gun delivery of "detergentized" steam. Unit generates 100 lbs. steam pressure in 1 minute (has a rated capacity of 200 lbs. pressure.) Unit stresses simplicity of operation... minimum of maintenance.

Stationary Units may be easily mounted on sturdy rubber wheels for round-the-plant floor and equipment cleaning or for paint stripping. Machine may be chassis mounted for safe, rapid transportation for cleaning in the field. Write address below for illustrated folder. On your letterhead, please.

TRY OAKITE-VAPOR UNIT ON SUCH JOBS AS: Paint Stripping
Floor Cleaning • Degreasing Chains • Heavy Equipment
Removing Lapping Compounds • Cleaning Walls, Windows
Skylights • Garage Cleaning of Motors • Chassis etc.



Aarch 17, 1947

approximate brinell hardness values within the builtup edge and its fragments of well over 400. This high hardness is the result of the severe deformation that these portions of the metal undergo during the cutting process. This extreme induced hardness of the metal accounts for the ease with which even mild steels can abrade away the cutting edge of a high speed steel tool.

In Fig. 6 is shown the hardness distribution in a typical type 2 chip. Here builtup edge is nonexistent; no hard fragments appear and the surface of the work piece is smooth. It is obvious that this latter cutting condition is the more desirable, particularly if the machined surface is to be used for a bearing sur-

The oscillogram, another type of photographic record, proved valuable in the analysis of vibration in a machine tool. Such vibrations may be either forced or natural. Oscillograms were used in the study of both types. In Fig. 7 are shown oscillograms of the forced oscillation occurring in a cutting tool used in two different cutting operations. The frequency of the forced oscillation in each case corresponds to the rate at which fragments of the builtup edge passed off with the chip. This accounts for the difference in the frequency of vibration for the two cutting speeds.

In the above operation, when frequency of the forced vibration approached the natural frequency of the cutting tool setup, the tool would chatter violently. By changing the tool overhang or the moment of inertia of the system, the natural frequency was changed and the tool chatter eliminated.

Much information may be gathered from a series of oscillograms of this type. Magnitude and range of frequencies of vibration that the machine tool may have to withstand can be predetermined. This information may be helpful in machine

In metal cutting research, constant use is made of photography for the direct recording and study of surface finish. Further, it has been found that photomicrographs of transparent replicas of a surface (for example, Faxfilm) often are very useful. Note Fig. 8. This presents a comparison of the "machinability" of two metals with respect to surface finish when cut under similar conditions. It is quite obvious from these photographs that metal A is more desirable than metal B on the basis of quality of surface finish.

Standard techniques are used in obtaining replicas for such pictures as these. However, a special photographic method was developed to show more clearly the ridges in the replica. The setup shown in Fig. 9 is used. Faxfilm on the stage of the microscope is backed up by a slightly inclined mirror so that oblique light is reflected back through

the film. Hence the ridges on the replica become prominent and can be photographed at any desired magnification. Photographs shown in Fig. 9 were taken at 20 magnifications.

Application of photoelastic stress analysis to the cutting process supplies its share of information on the machining operation. A typical setup used in such studies is shown in Fig. 10. Here a celluloid model of the workpiece is being cut. The chip may be seen curling away from the tool in the form of a circle. In this technique the workpiece is illuminated with polarized light. By this method one can readily observe how the geometry of the cutting tool affects the magnitude and distribution of the stresses in the work; any points of stress concentration also are readily ascertained.

Typical pattern from a machining operation as viewed through the analyzer of the polariscope is shown in Fig. 11. This illustrates stress distribution for one particular rake angle and one set of cutting conditions. Fringes indicating stress contours are quite pronounced. Some of the important angles involved in the geometry of chip formation are indicated on the photograph. The magnitude of these measured angles is in line with the theoretical values.

Similar photoelastic stress analysis often is applied to plastic models of machine members, thus predetermining stress distribution under expected loading conditions. A study of this kind enables the designer then to proportion the member itself in keeping with this predetermined stress distribution.

Improved designs in cutters and machine tools also have resulted from gathering minute details of fast action-this through the use of the ultra-high speed movie camera and by means of photoflash pictures. With the high speed movie camera, taking pictures at the rate of 3000 frames per second, merits of the cutter may be observed with respect to chip formation, chip flow and degree of chip crowding.

Even though surface speed of the tool shown in the sequence of motion picture frames in Fig. 12 is in excess of 400 fpm, the details of its cutting action are clear. Note how a completed chip, having adhered to the cutting edge at the end of the previous cut, has been knocked loose by the newly formed chip and now is travelling upward. The effect of altering the geometry of the tool is manifested in a study of this kind. Rigidity of the machine itself likewise may be determined by observing the action of the cutter as the tooth enters the work.

By use of the high speed movie camera, time in effect is "magnified." However, if one is interested in stopping motion instantaneously to observe action as of a certain instant, then the photo-flash camera is sufficient. For this purpose an ordinary camera is combined with a special photo light that releases a flash of only 3/1,000,000 sec duration the resulting photograph revealing details of action at that specific instant Fig. 13 is one of such pictures showing a large corner angle cutter in the process of removing a cast iron chip. The cutting speed is over 300 fpm. By this means, cutting action may be analyzed at any instant during the operation.

Recently x-ray diffraction has become a photographic tool in metal cutting research. Surface quality of a machined part may be analyzed fully by this means. Also, through the medium of the x-ray camera, residual stresses and depth of cold work in a surface are disclosed. In addition, x-ray photographs make pos sible the quality control of the work piece with respect to the structure of the metal, its grain size, degree of cold work and composition, Structure of hea treated parts may be scrutinized with x-rays to determine the mechanism of recrystallization, age hardening phe nomena, relief of strain, grain growth and degree of decarburization.

As an example of a cold worked meta as seen through the x-ray camera, not Fig. 14. This view was taken of a rolled aluminum plate. Degree of cold work i indicated by the nonuniformity of the concentric circles. Upon annealing the specimen, the cold worked condition was eliminated when recrystallization o the metal and grain growth occurred Fig. 15 illustrates this situation. The more or less uniform scattering of the dots in dicates the absence of cold work.

Tangible results of these investigation have materialized in the shape of im provements in the structure and there by in the performance of machine tools in improved design of cutting tools; and in closer quality control of metals to be machined. In addition, the eye o the camera is aiding considerably 4 bringing about better understanding of the "Mechanics of Metalcutting." Such varied and practical applications of the camera proves it to be an invaluable re search tool.

REFERENCES

1 "High Speed Milling with Negative Rak Angles," by Hans Ernst, Mechanical Engineering, Vol. 66, May 1944, pp. 295-299.

2 "New Methods of Analysis of Machinin Processes," by M. Eugene Merchant and N. Zlatin, Proceedings, Society for Experiment Stress Analysis, Vol. 3, No. 2, 1946, pp. 4-23

3 "Physics of Metal Cutting," Hans Ernst, Mechaning of Metals, American Society for Metal 1938, pp. 1-34.

4 "Mechanics of Metal Cutting Process Orthogonal Cutting and a Type 2 Chip." N. Eugene Merchant, Journal of Applied Physic Volume 16, No. 5, pp. 267-275, May 1945.

5 "Effect of Microstructure on the Machini bility of Cast Irons—Part 1," Michael Field an E. Stansbury, A.S.M.E. semiannual meeting

Stansbury, A.S.M.E. semiannual meeting

June 1946.

"The Distribution of Hardness in Chips an Machined Surfaces," Norman Zlatin and M. Et gene Merchant, *Proceedings*, Society for Expermental Stress Analysis, Volume III, No. 2, 1940 pp. 4-28.

New Products and Equipment

. Milling Attachment

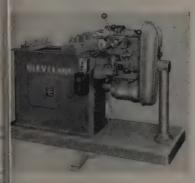
Milling attachment developed by Kylebinson Machine Co., 1627 West Pico pulevard, Los Angeles 16, fits in with the lapter base and quick change system of the tooling, and may be mounted on any engine lathe in a matter of seconds.



th milling job, such as accurately millg keyways, flats and small shafts. Attachment is graduated in thousandths d has a vertical travel of 6 in. Its jaw ening is 2%-in. Development is flexible ough to permit angle milling, and may tilted at will by the operator.

. Tapping Machine

Designed for drilling and tapping large pper anodes to receive hanging hooks, horizontal combination machine develed by Cleveland Tapping Machine Co., artville, O., incorporates features which the it suitable for a wide variety of ap-



cations in performing these operations long and irregular-shaped work pieces. A hand control indexes the head for secutively drilling and tapping. Depth hole and withdrawal of tool are autotically controlled. An air operated vise holding the work-piece as shown in stration is standard equipment. Air may be mounted on a special table ich functions as an air-operated crosse, positioning the work so that it may

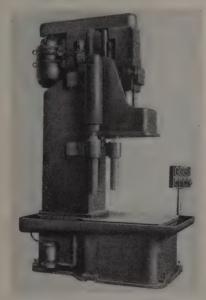
Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 138

be drilled and tapped at a number of predetermined points.

Work rest of machine may be placed on the ways or on brackets fastened to the end of the column to provide additional support for long pieces. Machine is powered by a 1 hp reversing motor and drills and taps holes up to ½-in., National coarse thread, in mild steel.

3. Drilling Machine

An automatic drilling machine, the No. 3 Drillmatic, built for special purpose adaptations, is announced by Robbins Engineering Co., 318 Midland avenue, Detroit 3. Any number of spindles may be



included in the head and all are driven by the machine spindle. When operations change the head can be removed and a new one mounted.

Saddle is operated by a ram from the hydraulic unit mounted on the machine column above the saddle. Hydraulic power is supplied from a compact, self-contained unit mounted at the top of the machine column. Pump, pump control mechanism, oil sump and hydraulic cylinder are fully enclosed.

A wide variety of spindle speeds is available by the use of the change gears within the unit and also by changing the V-belt cone pulleys on the motor and spindle. Auxiliary units may be mounted around the base horizontally, vertically, or any angle in between, making it possible for several operations to be performed at once and with one clamping of the work.

4. Belt Sheaves

Two new lines of QD sheaves, featuring groove-belt fit and reinforced arm construction are announced by Worth-



ington Pump & Machinery Corp., Harrison, N. J. Designated as the A and B lines, each features individual groove size to match belt size.

Reinforced arm construction of each sheave incorporates a longitudinally ribbed arm recessed down the middle, giving added strength.

5. Insert Roll

A new style insert roll, developed by M. E. Cunningham Co., 172 East Carson street, Pittsburgh 19, provides an efficient and economical method of marking steel tubing, Marking is done after



the final operation on the sizing rolls. A special steel holder is also available complete with shaft for attaching to machine.

The new insert roll is made of safety

135

Mecco alloy steel in three separate parts: (1) Side ring and hub machined from solid bar of high alloy steel; (2) type insert ring, mortised for number of inserts required; and (3) locking ring which holds type inserts in place. Insert ring is locked to side ring by means of Allen head set screws (4). Inserts (5) are engraved with the face radiused slightly less than outside diameter of the type ring, and are held securely by steel pins (6), which fit into holes drilled into side ring and locking ring.

6. Inspection System

An automatic inspection system for small parts which consists of an electronic light-indicating comparator with automatic classification of parts up to 1½-in.



sphere maximum size is announced by Arma Corp., Brooklyn, N. Y. Equipment inspects, counts and sorts parts and places them in good and rejected groups. Broad range of adjustable tolerances and speeds up to 7000 pieces per hour is possible with the system. Change over from one part to another or from one dimension to another may be accomplished in a matter of minutes.

7. Tester Instrument

Pyrometer Service Co. announces a new unit for obtaining accurate surface roll temperatures. Known as RollTemp, it is essentially a surface pyrometer with its delicate indicating instrument separated from the thermocouple. The instrument proper is mounted permanently on the machine requiring tests. Operator handles only the thermocouple.

The thermocouple is pressed lightly against the hot surface and instant temperature reading is obtained on the instrument dial. Diameter of the heated surface determines the size of the thermocouple spacing plate.

8. All-Purpose Shovel

Designed for mining and quarrying particularly involving ore and rock, the 93-M all-purpose shovel, dragline, clamshell and crane introduced by Marion Power Shovel Co., Marion, O., is a full-rated 2½ cu yd machine. Features of the new machine include air control, ease of convertibility to dragline, clamshell and crane service and ease of preparation for railroad shipment.

Shovel front-end equipment includes an all-welded, rounded-edge, box section boom, twin welded full box section dipper handles and a heavy duty manganese-steel-front dipper with inserted, socket-type dipper teeth. For dragline or clamshell service, varying boom length and bucket combinations are available as job conditions may require. A live boom hoist is standard equipment, making the machine particularly adaptable for crane service.

9. Printer-Developer

Requiring only one operator, the Volumatic model 91 BW printer-developes manufactured by Charles Bruning Co Inc., 4754 Montrose avenue, Chicago 41, is intended for large-volume production of cut sheets, and accommodates



roll stock up to 42 in. wide. It print and develops all mediums, including light, regular or card-weight paper print with black or colored lines on white back grounds, black or colored line pape prints on green-tinted backgrounds, transparent paper prints, cloth or film prints Prints are produced in volume at speed up to 30 fpm.

One of its features is a large feet board, providing more than 13 sq ft of space for handling large volume production. Sensitized medium and original copy are drawn into machine by a vacuum feed. Light is provided by a stationary 75 w per inch mercury are light mounted within a revolving Pyrex cylinder. Unit may be installed almost any where in a drafting room or engineering department.

10. Self-Flaring Fitting

Development of a two-piece, completely self-flaring tube fitting is an nounced by Brockway Co., Naugatuck Conn. Known as the Uniflare, it may bused with tubing of copper, aluminum Monel, plastics, Bundyweld and severe varieties of steel.

Plain end tubing is inserted in the fitting and made up in the conventional manner. The tube is self-extruded and self-flared by simple wrench action during the makeup. The fitting is so designed that the nut, body and thrust collar combine to produce the same action as an extrusion press—the thrust collar shearing from the nut when wrench pressure is applied. The thrust collar



acts as the dummy block and compression member to grip the tube and force t into a precisely shaped 37 degree flare. The extrusion and coining action of the parts produces a leakproof joint that is einforced against pressure and vibration. Fitting is made in sizes from 1/8 to 3/4-in., in all the usual commercial hapes.

11. Plating Rectifier

Development of an electroplating ectifier is announced by Wagner srothers Inc., Dept. K, 433 Midland evenue, Detroit 3. The Wagner-Tiede-uan rectifier assembly employs metallic elenium-on-aluminum cells, said to andle momentary overloads of as much



s 1000 per cent of normal capacity. luminum back plates provide maximum poling, and low velocity air circulation provided by three 10 w fans with an imperage of only 1.5.

Rectifier reduces power costs while aintaining high efficiency, offering an fective rectifying area of over 4300 sq. Transformer is of the two-winding ally insulated type with ample reserve pacity. Occupying a floor area of 5½ ft, the rectifier is 34 in. high, 36 in. ng, 22 in. wide. Its steel welded enosure is designed so that units may be acked vertically for higher power.

2. Fatigue Tester

To fill a demand for a bench-type igue testing machine with the "connt-force" loading feature, Baldwin Lomotive Works, Philadelphia 42, is offer; the Sonntag model SF-2 machine. It ords flexure fatigue tests on sheet stock any material—metal, plastic, wood—d requires no attention during the test. Machine uses a revolving eccentric iss as a means of loading the specimen. ad automatically remains constant revolves of the changes in the amount of flection of the specimen. Predetermined d is alternately applied to the specimen.

men, and the resulting deflection is incidental

Because of its comparatively small size, 15 x 12 x 32 in., the testing machine can be placed in a cabinet during a test so that temperature and humidity can be



controlled. Machine weighs 115 lb, has an alternating force capacity of 20 lb and a speed of 1800 cycles per minute with a total travel of the loading yoke of 1 in. per cycle.

13. AC Power Supply

Power plant Voltbox manufactured by Superior Electric Co., 240 Church street, Bristol, Conn., offers a compact, portable source of metered, continuously adjustable alternating current voltage and current. Three ranges of output voltages and two ranges of output current are available. The variable voltage and current feature



is achieved by two Powerstat variable transformers operating in conjunction with auxiliary transformers. Voltage and

FOR MORE INFORMATION

on products and equipment described in this section, fi'll in a card following page 138.

current are varied independently and are electrically isolated from each other.

For metering purposes, a triple range voltmeter and a double range ammeter are supplied. When it is required to measure external voltages and currents, these meters can be employed for such purposes by throwing the lever-action switches located below each meter. The circuit is designed for use on either 115 or 230 v 50/60 cycles power lines. The output voltage ranges are 0.30, 0-150, and 0.300 vs while the current ranges are 0-5 and 0-20 amp. A circuit-breaker offers complete instrument protection.

14. Recording Pyrometer

Fast changing temperature may be recorded or controlled with split-second speed on one chart with the type G pyrometer available from Leeds & Northrup Co., 4907 Stenton avenue, Philadelphia 44. Recorders follow a key tem-



perature so swiftly that they detect fluctuations in a fraction of a second. A strip-chart instrument, it is available for use either with thermocouples or Rayotubes, and can be supplied to operate any of the company's signals and controls for any temperature range.

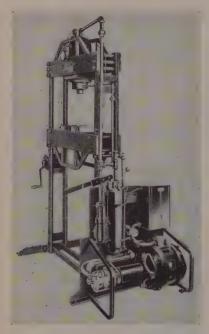
Chart passes over a metal plate so that notes can be jotted on it without interrupting operation. Door opens wide to left and chart drive unlatches to swing out to the right. Terminal board and fuses are easy to reach at rear of case. Curve-drawing pen holds enough ink to last the average single-point recorder for several weeks. Instrument operates on 115 v, either 50 or 60 cycles.

15. Hydraulic Arbor Press

Motor-driven hydraulic arbor presses of 25, 50, 60 and 75-ton capacities, built by K. R. Wilson, Buffalo, N. Y., are designed to relieve heavier presses of short runs or small work. Press bed is raised or lowered by a cable drum and crank. Since the frame is a weldment, most press dimensions may be changed to meet any particular problem. Operation of the ram is controlled by a motor valve control

which is actuated by a flip of finger and thumb.

Motor driven hydraulic pump used is a Seco radial type ranging in capacities from 3000 psi to 10,000 psi. All units are equipped with a pressure by-pass valve, permitting required tonnage pressure to



be accurately set and then maintained in successive operations. Another feature is the spring actuated, quick return ram which returns the ram to "open" position instantly, when the control lever is released.

16. Tap and Die Holder

Economical cutting of external and internal threads on small production runs of lathe turned parts is possible with the releasing tap and die holder offered by Falls Products Inc., Genoa, Ill., for use

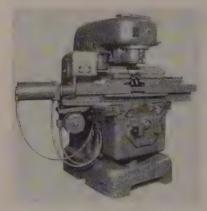


in both screw machine and ordinary engine lathes. Holder is made in three shank sizes: No. 2 Morse taper for use in engine lathe tailstock sockets; and in % and %-in, straight shank for use in screw machine turret heads. All sizes use 1-in, button type dies for external grinding or standard taps for tapping holes, held with 1-in, split bushings.

Operation of hardened and ground steel unit consists of inserting button die or tap with bushing in front recess of holder housing, securing with Allen set screw. Whole unit is placed or locked in lathe turnet head of tailstock and stops set for proper depth of thread. Holder housings release automatically when threading is complete and backs off when rotation is reversed.

17. Rotor Shaver

Shaving of electric motor rotor laminations without smearing and closing the laminations is possible with Red Ring rotor shaver made by National Broach & Machine Co., Detroit. Machining of the rotors from the rough in one operation combines three principles: Use of a fine pitch high precision cylindrical milling cutter operating at high speed; principle of crossed axes shaving; and principle of diagonally traversing work



across the cutter in order to spread cutter wear uniformly over its full face.

Cutter head is adjustable to provide a wide angular range between work and cutter axes. In addition, table has a 15-degree swing in its horizontal plane to provide the diagonal angle desired. Knee is adjustable vertically for different work diameters. Table travel, adjustment of head and tailstocks and knee are sufficient to accept rotors having a wide range of shaft lengths, face widths and diameters.

18. Welding Timer

Electronic welding timer type 30CR3, manufactured by Photoswitch Inc., 77 Broadway, Cambridge 42, Mass., is designed for interval timing of welding operations over a range of 3 to 120 cycles. Recommended for all general-purpose spot welders, it fulfills the specifications of NEMA class 1A timers. It is applicable to manual, air or motoroperated welding equipment requiring either beat or nonbeat operation.

The timing adjustment can be set for any interval from 3 to 120 cycles and is calibrated at these two settings, its accuracy throughout the range within 2 per cent. The timer may be used with either a 115 or 230 v ac supply.

19. SOLDERING TOOL

Fine soldering with pin point precision may be attained with small soldering tool offered by Luma Electric Equipment Co., Toledo, O. Gold and chrome alloys can be soldered with little effort in a minimum of time with little or no waste. Heat can be raised or lowered to meet the demand of fusing materials. Union is made through 6-stage selector incorporated in the tool.

20. MAGNIFIER

Magnifying unit for inspecting and general all-around use, as well as for use in die making is being manufactured by Dayton Rogers Mfg. Co., Minneapolis. Lens is of 1½ in. diameter, with full universal mounting, with maximum height adjustment of 2 in. Mounting is on heavy pressed steel base.

21. COUPLING CAPACITORS

New high voltage coupling capacitors for coupling telephone equipment to existing 7200 v ac distribution lines are capable of withstanding 10 test impulses of 95 kw. Produced by Sprague Electric Co., North Adams, Mass., they are rated for 8700 v 60 cycle ac operation, are easily installed, and are designed to operate continuously without hazard to power lines.

22. MASONRY DRILL

Tungsten carbide tipped masonry drills for drilling cement, brick, slate, marble, tile, etc., fabricated from high alloy hexagon shaped steel, are being produced by Super Tool Co., 21650 Hoover road, Detroit 13, shape of each drill increases tool life, increases drill chuck life and furnishes necessary clearance for drillings and dust removal.

23. SANDING DISKS

AristoCraft power sanding disks, of tough, sharp-cutting aluminum oxide grit, resin bonded to a vulcanized fiber backing, are offered by Aristo Power Tools Inc., 601 West Washington boulevard, Chicago 6. Available in 7 and 9 1/8-in. diameters with standard grit densities, disks are pliable enough to meet many contour sanding requirements. They may be used on all types of flexible shaft and portable disk sanders.

FOR MORE INFORMATION

on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Market Summary

Scrap Sizzles as Buyers Press Demands on Market

Consumer resistance indicated in some directions but no definite sign yet seen that spiral is slowing down. Metallics generally buoyant. Speculation gains as to steel price trend when demand-supply balance is struck

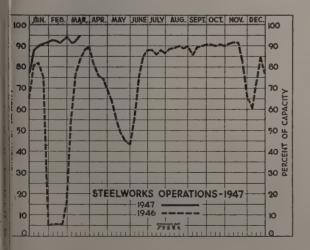
BOILING scrap iron and steel market continued to hold be center of attention last week though a few signs were prearing hinting of possible tapering of activity with ome consumer resistance to the high prices noted, and he large Pittsburgh steelmaker reported having canceled the least one contract with material flowing in substantial plume. There was no warrant to assume that the market is about at a turning point, however, since in other irections renewed upward pressure on the price structure as in evidence with several mills that had been with-blding orders resuming purchasing.

Buoyancy generally characterizes the metallics, and the flationary tone has not been relieved by President Truan's address to Congress on the grave international sitation. Price revisions last week, however, in the main ere more in the nature of wider adoption of higher levels

mounced the preceding week.

With steel production booming along at a record-breakg peacetime pace, increasing attention is being riveted a likely market developments over coming months. Genally, demand-supply balance is expected to be struck most steel products by midsummer, flat-rolled items beg an outstanding exception in this respect since little ope is held out for relief in these products until late in e year at earliest.

In view of prospective easier supply conditions in genal steel sellers are preparing for intensive sales competiin after midyear. This, in turn, is generating speculaon with respect to the probable trend of steel prices over



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week			
]	Ended		Same	Week
Ma	arch 15	Change	1946	1945
Pittsburgh	96.5	+ 2	92.5	89
Chicago	94	+ 1	85.5	99.5
Eastern Pa	88	None	77	92
Youngstown	91	+ 1	85	92
Wheeling	89	None	86	93.5
Cleveland	94	+ 3	93	91.5
Buffalo	90.5	+ 2	75	93
Birmingham	99	None	95	95
New England	94	+ 4	88	92
Cincinnati	91	None	76	72
St. Louis	74.5	None	67.5	80
Detroit	90	+ 3	90	86
Estimated national				
rate	95	+ 2	84.5	95

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

the fag end of the year, and some observers are expressing the view an easing in quotations would not be altogether surprising, beginning with the waiving of certain extras. This, it is said, will be especially true should production continue uninterruptedly and further sharp increases in labor and other costs be avoided. However, recent raw material price increases may temporarily force upward revisions in some semifinished steel items which would serve as a brake on the market generally.

As regards scrap, bell-wether in the current inflationary spiral, opinion increasingly is voiced that once the peak is attained, a definite, and perhaps, sharp reaction can be expected. This market, it is believed, has advanced too rapidly for any sustained period of stabilization to follow once the top is reached.

Steel supply continues tight but tension is relaxing here and there. Flat-rolled specialties, such as stainless sheets, and, in some degree, electrical sheets show an easing tendency. Hot and cold-rolled sheets and strip, galvanized and enameling sheets show little change from previously reported tight supply positions. Plates also are scarce, second only to sheets and strip with some producers virtually out of the market.

Steelmaking operations increased 2 points further last week to 95 per cent of capacity, highest since May, 1945, and equivalent to weekly output of 1,662,431 net tons, Operations gained 4 points to 94 per cent in New England, 3 points at Cleveland and Detroit to 94 and 90 per cent, respectively, 2 points at Pittsburgh and Buffalo to 96.5 and 90.5 per cent, respectively, and 1 point at Chicago and Youngstown to 94 and 91 per cent respectively. Elsewhere district ingot rates held unchanged.

Last week various adjustments in pig iron and scrap prices, largely reflecting previously announced changes, pushed Steel's composite price averages on these products higher, pig iron rising from \$32.11 to \$32.49, and steelmaking scrap from \$35.58 to \$36.58. The composite prices on finished steel held unchanged at \$69.73 and on semifinished steel at \$52.10.

COMPOSITE MARKET AVERAGES

				One	Three	One	Five
				Month Ago	Months Ago	Year Ago	Years Ago
	Mar. 15	Mar. 8	Mar. 1	Feb., 1947	Dec., 1946	Mar., 1946	Mar., 1942
Finished Steel	\$69.73	\$6 9.73	\$69.73	\$69.73	\$64.75	\$63.54	\$56.78
Semifinished Steel	52.10	52.10	52.10	52.10	41.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.11	29.67	29.56	29.10	25.13	23.00
Steelmaking Scrap	36.58	35.58	34.33	32.73	27.69	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pir Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Excellents, Chicago and eastern Pennsylvania. Finished steel, net tons; ethers, gross to

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	1947	1947	1946	1946
Steel bars, Pittsburgh	2.60c	2,60e	2.55c	2.50c
Steel bars. Philadelphia	2.98	2.98	2.91	2.82
Steel bars, Chicago	2.60	2.60	2.55	2.50
Shapes, Pittsburgh	2.50	2.50	2.35	2.35
Shapes, Philadelphia		2.64	2.48	2.465
Shapes, Chicago	2.50	2.50	2.35	2.35
Plates, Pittsburgh		2.65	2.50	2.50
Plates, Philadelphia	2.85	2.85	2.558	2.55
Plates, Chicago	2.65	2.65	2.50	2.50
Sheets, hot-rolled, Pittsburgh		2.50	2.48	2.425
Sheets, cold-rolled, Pittsburgh		3.20	3.19	3.275
Sheets, No. 10 galv., Pittsburgh		3.55	†3,675	†4.05
Sheets, hot-rolled, Gary		2.50	2.481	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.218	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	13.675	t4.05
Hot-rolled strip, Pittsburgh		2.50	2.462	2.35
Cold-rolled strip, Pittsburgh	3.20		3.162	3.05
		3.20		
Bright basic, bess. wire, Pittsburgh.		3.425	3.05	3.05
Wire nails, Pittsburgh		4.125	3.75	3.25
Tin plate, per base box, Pittsburgh.	\$5.75	\$5.75	*\$5.25	*\$5.25

^{*} Nominal. † Base changed in December to 10 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	\$50.00	\$50.00	\$38.00	\$38.00
Slabs, Pittsburgh, Chicago Rerolling killets, Pittsburgh	42.00 42.00	42.00 42.00	39.00	39.00 39.00
Wire rods 1/4 to 1/2-inch, Pitts.	2.675c		‡2.425c	‡2.30c

[‡] Base, No. 5 to \$2-in.

Pig fron

, , , , , , , , , , , , , , , , , , ,	farch 15, 1947	Feb., 1947	Dec., 1946	Mar.,
Bessemer, del. Pittsburgh	\$34.83	\$31.83	\$31.77	\$27.315
Basic, Valley	33.00	30.00	29.50	25.625
Basic, eastern del. Philadelphia	35.52	32.01	31.93	27.465
No. 2 fdry., del. Pgh. N. & S. sides	34.33	31.33	31.27	26.815
No. 2 idry., del. Philadelphia	36.02	32.51	32.43	27.965
No. 2 foundry, Chicago	33,00	30.50	30.00	26.125
Southern No. 2 Birmingham	29.88	26.88	26.88	26.565
Southern No. 2, del. Cincinnati	34.75	31.75	30.94	27.965
Malleable, Valley	33.50	30.50	30.00	26.125
Malleable, Chicago	33.50	30.50	30.00	26.125
Charcoal, low phos., fob Lyles, Tenn.	40.50	37.50	37.50	37.340
Gray forge, del. McKees Rocks, Pa	33.66	30.66	30.61	26.315
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.00	140.000

Scrap

Heavy melting steel, No. 1, Pittsburgh	\$38.00	\$33.75	\$28.50	\$20.00
Heavy melt. steel, No. 2, E. Pa	39.25	33.25	27.38	18.7
Heavy melting steel, Chicago		31.25	27.19	18.79
Rails for rerolling, Chicago		38.50	31.00	22.2
No. 1 cast, Chicago	43.50	42.50	36.90	20.00

Coke

\$8.875 10.375 16.10	\$8.875 9.875 16.10	\$8.75 9.50 15.288	\$7.50 8,25 13.75
	10.375	10.375 9.875	10.375 9.875 9.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight,

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, \$40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, \$52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$42; Portsmouth Steel Corp., \$55-\$60, Portsmouth, O. Detroit, del., \$45; eastern Mich., \$46.

Forging Quality Blooms, Slabs, Billets: Pitts-burgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$50; Detroit, del., \$53; eastern Mich., \$54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$61; del. Detroit \$64; eastern Mich., \$65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$50; Portsmouth Steel Corp., \$66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 1b 2.35c.

Wire Rods: Pittsburgh, Chicago, Cieveland, Birmingham, Ja to 1/4-in., inclusive, \$2.55-\$2.80 per 100 lb. Galveston base, \$2.65. Worcester, add \$0.10. San Francisco (base, del.), \$3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Plittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich. 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing

points as merchant carbon bars, except base is

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c. (Texas Steel Co. uses Chicago hase price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c. Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; Detroit, del., 2.60c; eastern Mich. and Toledo, 2.65c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2:60c-2.95c; Detroit, del., 2.75c; eastern Mich. and Toledo, del., 2.80c. Iron Bars: Single refined, Pittsburgh, 6.15c-f6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c, † Hand puddled.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c. (Andrews Steel Co., quotes on Middletown, O., base for shipment to Detroit area; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown,

base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c.

Corrugated Galvanized Sheets, No. 10: Pitts-burgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, not corrugated, copper alloy: Pittsburgh, Chicago, Gary, Birmingham, 4.15c; Granite City, 4.25c; copper iron 4.50c; pure iron, 4.50c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: 4.20c, Pittsburgh, Chicago, Gary: 4.30c, Kokomo, Ind. Armature: 4.50c, Pittsburgh, Chicago, Gary: 4.60c, Granite City, Ill., Kokomo, Ind. Electrical: 5.00c, Pittsburgh, Chicago, Gary: 5.10c, Granite City, Kokomo, Moor: 5.75c, Pittsburgh, Chicago, Gary: 5.85c, Granite City. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh; 6.55c, Granite City. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh; 6.55c, Granite City.

Hot-Rolled Strip: Pittsburgh, Chicago, Gary Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Su-perior Steel Corp., 3.30c, Pittsburgh.)

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Stee Corp., 4.70c, Pittsburgh.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; add 0.20c for Worcester.

in. Terne. Plate

a Plate: Pittsburgh, Chicago, Gary, Warren, 100-lb base box, \$5.75; Granite City, Biragham, Sparrows Point, \$5.85. estrolytic Tin Plate: Pittsburgh, Gary, Wart, O., 100-lb base box 0.25 lb tin, \$4.85; 0.50 tin, \$5.05; O.75 lb tin, \$5.25; Granite City, mingham, Sparrows Point, \$4.95, \$5.15, 35, respectively.

Mill Black Plate: Pittsburgh, Chicago, , Warren, O., base 29-gage and lighter, Granite City, Birmingham, Sparrows

anufacturing Teraes (Special Coated): Pitts-ish, Chicago, Gary, 100-base box \$4.90; anite City, Birmingham, Sparrows Point, 09.

ofing Ternes: Pittsburgh base per package: sheets; 20 x 28 in., coating I. C. 8-lb 3.50; 15-lb \$15.50.

ates

cton Steel Plates: Pittsburgh, Chicago, Gary, veland, Birmingham, Youngstown, Sparrows at, 2.85c; Coatesville, Claymont, Geneva, th, 2.80c; New York, del. 2.94c; Phila., del., 5c; St. Louis, del., 2.47c; Boston, del., 2.86c. i Francisco and Los Angeles, del., 3.46-3.52c. antral Iron & Steel Co., Harrisburg, Pa., O., basing points; Alan Wood Steel Co., sahohocken, Pa., 2.80c, Coatesville and Claynt equivalent.)

or Plates: Pittsburgh, Chicago, 3.90c

en-Hearth Alloy Plates: Pittsburgh, Chicago, 87c; Coatesville, 4.15c.

d Steel Plates: Coatesville, 10% cladding: kel clad, 21.50c; inconel-clad, 30.00c; monel-1, 29.00c.

lapes

uetural Shapes: Pittsburgh, Chicago, Gary, mingham, Buffalo, Bethlehem, 2.50c; Gen-, Utah, 2.65c; New York, del., 2.70c; Phila., , 2.64c. San Francisco and Los Angeles, , 3.37c-3.41c,

poenix Iron Co., Phoenixville, Pa., nominally, c., Bethlehem, Pa., equivalent.)

el Piling: Pittsburgh, Chicago, Buffalo, \$3

ire and Wire Products

b Pittsburgh, Chicago, Cleveland and Bir-gham per 100 pounds).

e to Manufacturers in carloads

tht, basic or bessemer*\$3.30-\$3.55 ing (except Birmingham) **\$4.25 e Products to Trade

Is and Staples
ndard and cement-coated....†\$3.75-\$4.50
vanized.....‡\$3.75-\$4.50 e, Merchant Quality ealed (6 to 8 base) \$\$3.95
vanized (6 to 8 base) \$\$4.40
b Pittsburgh, Chicago, Birmingham, per ren fence, 15 gage and heavier.
bed wire, 80-rod spool
bless wire, twisted
ce posts (no clamps)
ties, single loop

Worcester, \$3.40, Duluth, \$3.35, base. San

Worcester \$4.35, Duluth and Trenton, N. \$4.50, base. San Francisco (base, del.) 3 for MB spring wire; \$5.28, black premier. Worcester \$4.05, Cleveland \$3.85, base. San iclsco (base del.) \$4.83. Duluth \$3.75, Cleveland \$3.85, base. San iclsco (base, del.) \$4.83.

Worcester \$4.05, annealed, \$4.50, galvan-Duluth \$3.95, annealed; \$4.40, galvanized San Francisco (base, del.) \$4.96, an-ed; \$5.41, galvanized

San Francisco (base, del.): Woven fence, barbed wire, 114; bale ties, 110. Duluth e): Woven fence, 84; barbed wire, 94; fence

ils, Supplies

s: Standard, over 60-lb, fob mill, \$2.50 per lb. Light rails (billet), Pittsburgh, Birming-\$2.85 per 100 lb; light rails (rail steel), 5, Williamsport, Pa. 1919, 60 lb and over, fob railroad and ng point, \$46-\$49 per net ton.

6.75c. Tie plates, \$2.80 per 100 lb, fob mill; \$3.15 base, Seattle. Splice bars, \$3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about \$200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt \	Weld
--------	------

	Steel	Iron
In.	Blk. Gal.	In, Blk, Gal.
3/8	48 23	1/2 2 +20
1/4 & 3/8	51 301/4	%—11½ +1 0
1/2	551/2 41	1-1417 + 2
%	$58\frac{1}{2}$ 45	11/2—221/2 — 11/2
1-3	601/2 471/2	2 23 2

	St	eel		1	ron
	Blk.		In.		Gal.
2		391/3	114	1	
2½-3	56	421/2	11/2	— 7	13
3½-6 *8	58	441/2	27		+ 5½ + 1½
		421/2	21/2-31/2	17	
*10	571/2	42	4		- 4
*12	201/2	41	41/2-8 .	19	- 21/2

Steel In. *8 *10 *12 Blk. Gal. Blk.

• Not T. & C.

* Not T. & C.

Line Pipe: Base price in carlots to consumers about \$200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.		Seamless		Butt We	
$\frac{2}{21/3}$	& 3	54	½ ¼ & %		
31/2	to 8	56	1/2	54	1/2
		5414	1 to 3		

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		Sear	mless	-Elec.	Weld-
	O.D.	Hot	Cold	Hot	Cold
	Sizes B.W.G.	Rolled	Drawn	Rolled	Drawn
	1" 13		\$10.89	\$10.62	\$10.62
	114" 13		12.90	10.59	12.58
	11/2" 13	\$12.00	14.26	11.70	13.90
	1%" 13	13.65	16.23	13.31	15.82
	2" 13	15.29	18.17	15.00	17.95
	2¼" 13	17.05	20.26	16.71	20.00
	2¼" 12	18.78	22.31	18.38	22.00
	21/2" 12	20.57	24.43	20.11	24.07
٠	24," 12	21.80	25.89	21.27	25.46
	3" 12	22.87	27.18	22.26	26.68
	3¼" 11	26.88	31.94	26.15	31.33
	3½" 11	28.86	34.30	28.06	33.64
	4"" 10	35.82	42.55	34.78	41.68
	41/2" 9	47.48	56.42		
	5." 9	54.96	65.30		
	6" 7	84 38	100.25		

Pipe, Cast Iron: Class B, 6-in. and over \$65 per net ton, Birmingham; \$70, Burlington, N. J.; \$75.56, del., Chicago; 4-in. pipe, \$5 higher, Class A pipe, \$3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

O		
Carriage and Machine		
1/4-in, and smaller; up to 6 in, in length	55	off
and %, up to 6 in. in length	52	OII
7 and %, up to 6 in. in length % x 6 in	49	off
	ard.	- 22
% and 1 in. x 6 in. length	DIT	off
1% in. and larger in all lengths and &		
in, and larger in lengths over 6 in	48	off
¼ in, and smaller, longer than 6 in,	45	off
Tire bolts	31/6	off
Otan balta	40	~ 00

Plow bolts 57 off

A.S.

Stove Bolts
In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

	A.S. Reg. and
Semifinished hexagon	Light Heavy
7-in, and smaller	51 off
%-in, and smaller	
½-in1-in.	
½-in1-in. 1½-in1½-in.	
1 78 -1111 72 -111.	44 000
1%-in. and larger	44 011
Additional discount of 15 for	r run containers.

			E.	EW.	CE (••	44	3	~	2	4		2	v	-	v	ш	نا	2								
													1	ì	31	i	g	h	t)				56	3	off	
(1																								_			
																								5	1	OI	
7/8	&	1	X	6		٠			٠	×		٠	٠	×	٠	٠	٠		٠	0	÷	0	è	4	7	Off	

Square Head Set Serews
Upset 1-in. and smaller
Headless, ¼-in. and larger
No. 10 and smaller

Rivets

Fob		Cleveland,	Chicago
Lebanor	ı, Pa under		5.256 5.406 55-5 of
Lebanor	n, Pa	.55-5 off plu	s 15c per cwt

Washers, Wrought

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg, carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

18.00 1.5 8.5 3 4.50 4.50

Stainless Steels

Base, Cents per lb

	Drawn				
	Wire.			Hot	Cold
	Struc-			Rolled	Rolle
Grade	turals	Plates	Sheets	Strip	Strip
	CHROMI	UM NIC	CKEL S	TEELS	
301	26.00c	29.50c	37.00c	22.00c	28.00
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
8	TRAIGH	IT CHR	MUIMO	STEEL	
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35,50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
•501	9.00	13.00	17.50	13.00	18.50
•502	10.00	14.50	18.50	14.50	19.50
+87	PAINLE	SS CLAI	D STEE	L (20%)
304		24.00	22.00		
410		22.00	20.00		
430		22.50	20.50		
446		29.00	27.00		

Low chromium.
 † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

Metallurgical Coke

	Price Per Ne Beehive O	vens	
Connellsville, New River, Wise county,	furnace foundry foundry foundry furnace		9.75-11.00 9.75-11.15 11.15 10.65

* Operators of hand-drawn ovens using trucked coal. \$9.35-\$9.60.

Coke Ry-Products

OOKE BY I I CAME IS	
Spot, gal, freight allowed east of Om	
Pure and 90% benzol	17.00e
Toluol, two degrees	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c
Per pound fob works	
Phenol (car lots, returnable drums)	
Do., less than carlots	12.00c
Do., tank cars	10.25c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to job-	
bers, "household use"	9.50c
Per ton, bulk, fob plants	
Sulphate of ammonia	\$30.00

PIG IRON

Prices per gross ton. Minimum delivered prices do not include 3 per cent federal tax.

	No. 2 Foundry	Basic	Bessemer	Mal- leable
Newark, N. J., del		\$34.00 35.84	\$35.50 37.34	\$35.00 36.84 38.00
Birdsboro, Pa., base	34.50 36.02	34.00 35.52	35.50 37.02	35.00 36.52
Birmingham, base Baltimore, del. Chicago, del.	36.28 34.12	29.38	34.50	
Cincinnati, del. Newark, N. J., del. Philadelphia, del. St. Louis, del.	35.96 35.13	34.25	,	• • • •
Buffalo, base Boston, del. Rochester, del. Syracuse, del.	33.00 39.48 34.84	32.50 38.98 34.34 35.00	34.00 40.48 35.84 36.50	33.50 39.98 35.34 36.00
Canton, Massillon, fob furnace.	33.00	32.50		33.50
Chicago, base	33.00 34.32 36.83	32.50 33.82	34.00 35.32	33.50 34.83 37.33
Cleveland, fob furnace	33.00 35.17	32.50 34.17	34.00 35.67	33.50 35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50 30.00	29.00 29.50	30.50 31.00	30.00 30.50
St. Louis, del	33.50 34.25	33.00 33.75	* * * *	33.50 34.25
*Neville Island, Pa., base Pittsburgh, del., N. & S. sides	33.50 34.33	33.00 33.83	34.00 34.83	33.50 34.33
Provo, Utah, base	33.50	33.00		
Sharpsville, Pa., base Steelton, Pa., base	33.50 34.50	33.00 34.00	34.00 35.50	33.50 35.00
Swedeland, Pa., base	35.50		36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00 36.50	32.50 36.00	34.00	33.50
*Youngstown, O., base *Mansfield, O., del	33.50 36.48	33,00 35,98	34.00 36.98	33.50 36.48

* Quoted prices were effective as of Mar. 1, 1947.

† To Neville Island base add: 66c for McKees Rocks, Pa.; \$1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; \$1.33, Oakmont, Verona; \$1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base) ...\$40.50 6.51-7.00, \$41.50 9.01-9.50, 46.50 7.01-7.50, 42.50 9.01-9.50, 46.50 7.51-8.00, 42.50 10.01-10.50, 48.50 8.01-8.50, 44.50 10.51-11.00, 49.50 8.01-8.50, 45.50 11.01-11.50, 50.50 Fob Jackson, O., per gross ton, Buffalo base \$1.25 higher. Buyer may use whichever base is more favorable able.

Electric Furnace Ferrosilicon: Sl 14.01-14.50%, \$52.75, Jackson, 0.7856 Keokuk, Iowa. Add \$1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; \$1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon
Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Charcoal Pig Iron

Charcoal Pig Iron
Semi-cold blast, low phosphorus,
Fob furnace, Lyles, Tenn.. \$40.50
(For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. \$33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., \$39, base; Philadel-phia, \$41.16, del. Intermediate phos-phorus, Central furnace, C'eveland, \$36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each addi-tional 0.25% nickel, \$1 a ton.

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

		per Duty	
Pa., M	o., Ky.	Heat Duty	. \$81.0
Pa., III		Mo., Ky	. 65.0
Ala., C	За		. 65.0
N. J.			. 70.0

Intermediate Heat Duty

7.00 9.00 1.00 2.00
1.00

Malleable Bung Brick

75.00

All bases .

Wire Cut

	Ladle Brick	
(Po	O W Va Mo.)	

Silica Brick

ennsylvania		٠.					65.00
oliet, E. Chicago.			4		D.	۰	74.00
irmingham, Ala.	٠			٠		0	65,00

Magnesite

Domestic ton, fob	dead	i-i ev	bu rel	rne ah	ed	g Wa	ra:	ins,	. 3
Bulk									24.
Single b	ags		w 1						28.

Rosic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick		 	59.00
Chem, bonded			59.00
Magnesite bric			81.00
Chem. bonded	magnesite		70.00

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	\$5.9
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.58
High phosphorus	5,58

Eastern Local Ore

Cents,	units,	del. E.	Pa.	
Foundry and				
contract .				14.00

Foreign Ore

Cents per unit, cif Atlanta	c ports
Manganiferrous ore, 45-	
55% Fe., 6-10% Mn	Nom.
N. African low phos	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African ba-	
sic, 50 to 60%	Nom.
Brazil iron ore, 68-69%	
fob Rio de Janeiro	7.50-8.00

Tungsten Ore

Wolframite,		
unit, duty	paid	 \$24_\$25

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charles-ton, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guar-antees are not met.)

*********	MIN SALITOMIS	
48%	2.8:1	. \$37.5
48%	3:1	. 39.0
48%	no ratio	. 31.0

South	African	(Transvaal)
44%	no rati	io\$27-5

48%	no	ratio. ratio. ratio.		ı,					30.00
Brazili:	an—	-nomina	ıĬ						

44% 2.5:1 lump \$33.65 48% 3:1 lump 43.50

27.50

	remodes	statt						
\$37.50			ratio					
	48%	no	ratio)	 	 		30
39.00 31.00	48%	3::	Llun	ıp	 	 		39
 02,00								1,

Domestic (seller's nearest rail)

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Nor-folk, Va., Mobile, Ala., New Or-leans, 63.00c-67.00c.

Molybdenum

Sulphide mines	conc.,	lb.,	Mo.	cont.,	
mines					\$1

Fluorspar

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngs- town	rows Point	Buffalo 1	Bethlehem	Can- ton	Massillon
Sheets, Hot-Rolled	3.75-3.85	3.75-3.85	3.75-3.85	3.85	3.85	3.75-3.85			
Cold-Rolled	4.55-4.75	4.55-4.75	4.55-4.75	4.75		4.55-4.75			
Galvanized	5.40								
Strip, Hot-Rolled	3.75-3.85	3.75-3.85	3.75-3.85	3.85					
Cold-Rolled	4.55	4.65	4.65	4.65					
Shapes, Structural	. 3.85	3.85		3.85			3.85		
Plates	4.10	4.10	4.10		4.10				
Bars and Bar Shapes.	4.00	4.00	4.00	4.00		4.00	4.00	4.00	4.00
Note: Lower level of q	uoted range	s represent	prices for	NAX H	gh Tens ile	, produced	by Great 1	Lakes S	teel Corp

WAREHOUSE STEEL PRICES

Base prices, cents per pound, for delivery within switching limits, subject to extras

									-BARS-			PLA7	res
	H-R 10G	C-R 10G	SHEETS- C-R 17G	Gal. •10G	Gal. •24G	FH-R	IP——	H-R	C-F	H-R Alloy (§4140)	Structural Shapes		Floor %" & Thicker
Boston (city)	4.50		5.224	6.804	6.804	4.65	6.36	4.62	5.47	7.12	4.47	4.80	6.42
New York (country)	4.42 4.32		5.27° 5.17°	5.47 ⁵ 5.87 ⁶		4.62 4.52		4.62 4.52	5.42	8.4212	4.37 4.27	4.72	6.35 6.25
Philadelphia (city) Philadelphia (country)	4.24 4.14	5.73° 5.63°	5.33° 5.23°	5.29 ⁵ 5.19 ⁵	6.54 ⁵ 6.44 ⁵	4.43 4.33	5.28 5.18	4.48 4.38	5.3 8	6.87 6.60	4.22 4.12	4.40 4.30	5.93 5.83
	4.09 8.59	6.15° 6.05°	5.65° 5.55°	5.14	6.395	4.40	* * **	4.45	5.35 4.85		4.34 4.24	4.39 4.29	5.90 5.80
	4.35			5.18*	6.435	4.65		4.70	5.6011		4.60	4.65	6.60
Norfolk, Va.	4.35	[+++	4					4.75	5.50		4.50	4.50	6.25
	4.00 3.90		4.70 ⁶ 4.60 ⁶	4.35 ⁵ 4.95 ⁶		4.30 3.90	4.95 4.60	4.05 3.95	4.95 4.85	6.60	4.05 3.95	4.60 4.20	5.90 5.45
Pittsburgh (city) Pittsburgh (country)	3.90	5.15° 5.05°	4.70 ⁸ 4.60 ⁸	5.05* 4.95*	6.30 ⁶ 6.20 ⁶	4.00 3.90	4.95 4.85	4.05 3.95	4.95 4.85	6.60 6.60	4.05 3.95	4.30 4.20	5.55 5.45
Youngstown, O. (city) Youngstown, O. (country)	4.188	5.338	4.888	5.05 4.95	6.30 6.20	4.00 3.90		4.238	5.138		4,218	4.488	5.178
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	5.1213	7.01	4.42	4.59	5.92
Cleveland (city)	4.00 3.90	5.15 ⁸ 5.05 ⁹	4.70° 4.60°	5.238	6.488	4.00 3.90	5.05 4.95	4.05 3.95	4.95 4.85	6.858	4.311	4.30 4.20	5.811
Cincinnati		5.2668		5.166		4.394		4.403	5.303		4.444	4.653	5.944
Chicago (city) Chicago (country)	4.00 3.90	5.15° 5.05°	4.70 ⁸ 4.60 ⁸	5.05 ⁵ 4.95 ⁶	6.30 ⁵ 6.20 ⁵	4.00 3.90	5.05 4.95	4.05 3.95	4.95 4.85	6.60 6.60	4.05 3.95	4.30 4.20	5.70 5.60
Milwaukee		5.3498	4.8998	5.2496	6.4995	4.199	5.249	4.249	5.149	6.899	4.249	4.499	5.899
St. Paul		5.534°	5.084	5.434	6.6845	4.40418		4.43413	5.7261	7.0841		4.68413	6.08411
Indianapolis			4.848	5.29	6.54	4.24	,	4.36‡‡	5.26		4.36	4.61	6.01
St. Louis	4.199	4,4 4/4	4.899°		6.674	4.199		4.249	5.32418	7.074	3.999	3.999	5.999
Birmingham (city) Birmingham (country)				5.20 ⁵ 5.20 ⁵		$\frac{4.10^{20}}{4.00^{20}}$		$\frac{4.05^{20}}{3.95^{20}}$	5.83		4.05 3.95	4.30 4.20	6.56
New Orleans			5.77°			4.83^{20}		4.78**	6.1411		4.68**	4.8320	6.9420
Houston, Tex.					6.0013	5.80 ¹	4 + + +	***				5.60	6.40
Omaha, Nebr		6.1188		5.918	7.1685	4.862		4.918	5.81811		4.918	5.168	6.568
Los Angeles			7.10		8.105	5.65	8.35	5.10	6.9019	7.85	5.20	5.20	7.20
San Francisco		· 1/4 ·	6.305		7.35	5.2014	8.35	4.7516	000	9.3516	4.9014	5.0014	6.8014
Tacoma, Wash.		/		7.305		5.2017		4.9017	6.7519	8.9519	4.9517	5.2517	7.251
Seattle			* * * *	7.30		5.201		4.9017	6.7510	8.9519	4.9517	5.2517	7.251

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip. 2000 to 39,999 pounds; cold finished bars, 1000 pounds and over; 1—any quantity; 2—300 to 1999 pounds; 2—150 to 2249 pounds; 4—three to 24 bundles; 450 to 1499 pounds; 4—one bundle to 1499 pounds; 4—one to nine bundles; 400 to 1499 pounds; 4—1000 to 1999 pounds; 450 to 39,999 pounds; 4—1000 to 39,999 pounds; 42—1000 pounds and over; 43—400 to 14,999 pounds; 4400 to 39,999; 4400 to 39,999; 4400 to 39,999; 4400 to 39,999; 4500 to 39,999; 4500 to 39,999; 4500 to 39,999 pounds; 4500 to 39,999; 4500 to 39,999 pounds; 4500 to 39,999; 4500 to 39,999 pounds; 4500 to 39,999

o Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; † basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; odd 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. 1.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; of counds under ¾ in 7.00c, ¾ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco; bar size angles, flats, rounds 5.00c, squares and half ovals 5.15c and bar size channels 5.55c at Houston.

Open Market Prices of Leading Ferroalloy Products

Spiegelelsen: 19-21% carlot per \$1.35; smaller lots \$1.40 eastern. allowed, eastern zone, \$2.50; smaller gross ton, Palmerton, Pa., \$40; Spot up 5c per lb. lots \$2.55. Spot up 10c. Pittsburgh, \$44. Ferrotitanium, High-Carbon: 15-20% Ferrochrome: Contract, lump,

Pittsburgh, \$44.
Ferromanganese, standard: 78-82%
cl. gross ton, duty paid, \$135 fob
ears, Baltimore, Philadelphia or
New York, whichever is most favorable to buyer, Birmingham, Ala.
twhere Sloss-Sheffield Steel & Iron
Co. is producer); \$140.25 fob cars,
Pittsburgh, including 75c switching
charge, (where Carnegie-Illinois
Steel Corp. is producer); add \$8 for
packed c.l., \$10 for ton, \$13.50 for
less ton; \$1.76 for each 1%, or
fraction contained manganese over
82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.70c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

contract basis, per net ton, fob Niagara Falls, N. Y., freight al-lowed to destination east of Missis-sippi river and north of Baltimore and St. Louis, 6.8% C \$142.50; 3-5% C \$157.50.

Ferrovanadium: V .35-.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Perrophosphorus: 17-19%, based on 18% P content with unitage of \$3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price \$58.50, spot \$62.25.

shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganess Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: (Contract, carlots, bulk 6.40c, packed 6.90c, ton lots 7.30c, smaller lots 7.70c, eastern, freight allowed; 6.65c, 7.15c, 7.90c and 8.30c central; 7.120c, 7.70c and 1.20c, vestern; spot up 0.25c; notched up 0.25c; 7.70c, person of the first person

Ferrockrome: Contract, lump, packed; high carbon, eastern zone, cl. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots.

High carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Spot prices up 0.25c.
Low carbon, eastern zone, bulk, c.l.,
max. 0.06% C 23c; 0.1% 22,50c,
0.15% 22c, 0.2% 21.50c, 0.5% 21c,
1% 20.50c, 2% 19.50c; add 1c for
2000 lb to c.l.; central zone, add
0.5c for bulk, c.l., and 0.65c for
2000 lb to c.l.; western zone, add
0.5c for bulk, c.l., and 1.85c for 2000
lb to c.l.; carload packed differential 0.45c. Prices are per pound of
contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

C.15%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller tots. Deduct 0.60c for bulk carlots. S. M. Ferrochrome, high carbon: (Cr 60-65%, Sl, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferruchrome, low carbon: (Cr 62-66%. Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 20.00c, packed 20.15c; ton lots 21.00c, smaller lots 22.00c, eastern, freight allowed, per pound contained Cr; 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c western; spot up 0.25c.

23.85c western; spot up 0.25c.
Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher. Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed. Chromium—Copper: (Cr 8-11%, Cu

ping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Sl 0.50% max.) Contract, any quantity, 45c eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; sport up 25c. spot up 2c.

Calcium metal; cast: Contract, tor lot or more, \$1.60; 100 to 1999 lb, \$1.95; less than 100 lb, \$3.15 per lb of metal, eastern zone; \$1.615, \$1.965 and \$3.185, western; spot up

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15-50c, ton lots 16-50c, smaller lots 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

spot up 0.25c. Calcium - Silicon: (Ca 30-35%, Si

60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, smaller lots 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 13.65c; 2000 lb to c.l., 15.05c; central zone, 14.25c and 17.30c; western, 14.85c and 19.05c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 13.15c, 2000 lb to c.l. 14.65c; central, 13.85c and 16.90c; western, 14.45c and 18.65c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si eastern zone, bulk, c.l. 6.15c, ton lots 7.05c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c. containing exactly

Ferrosilleon: Weighing about 5 lb and containing exactly 2 lb Sl, packed, eastern zone, c.l. 4.20c, ton lots 4.60c, smaller lots 5c; weighing about 2½ lb and containing 1 lb Sl, packed, eastern zone, c.l. 4.35c, ton lots 4.75c, less 5.15c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots; rices are fob shipping point, freight allowed; spot

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of me.al, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 11½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max, and C 3% max.) Prices per lb of alloy. Contract, ton lots \$1.89, less \$2.01, eastern, freight allowed; \$1.903 and \$2.023, central; \$1.935 and \$2.055, western; spot up 5c.

And \$2.050, western; spot of occurrence of the contract of the

Borosii: 3 to 4% B, 40 to 45% Si; \$6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

prices 0.25c higher. Deduct 0.50c for per 1b; smaller lots, 50c per 1b, bulk carlots.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 12.50c, ton lots 13.25c, smaller lots 14.00c, eastern zone, freight allowed; 12.80c, 14.35c and 15.10c, central; 12.80c, 16.30c and 17.05c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract or spot, carlots, bulk 12.00c, packed 12.75c; ton lots 13.50c, smaller lots 14.25c, enstern zone, freight allowed; 12.30c, 13.05c, ...14.60c, ...15.35c, central; 12.30c, 13.05c, 16.65c, 17.30c, western

Borosil: 3 to 4% B, 40 to 45% Si; 56.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) Prices per lb diloy, contract or spot, carlots, bulk 11.75c, packed 12.50c, ton lots

13.25c, smaller lots 14.00c, easter freight allowed; 12.05c, 12.80 16.30c, 17.05c, western.

Zirconium Alloy: 12-15%, per of alloy, eastern, contract, carlo bulk 4.85c, packed 5.30c, ton k 5.65c, smaller lots 6.00c; spot 0.25c

Zirconium Alloy: Zr 35-40%, easter contract basis, carloads in bulk package, per 1b of alloy 14.50c, b lots 15.75c, smaller lots 17.00c; sp up 0.25c.

Alsifer: (Approx. 20% Al, 40%: 40% Fe). Contract basis fob Niaga Falls, N. Y., lump per lb 6.25c; to 105 6.75c; smaller lots 7.25c. Stup ½c.

Simanal: (Approx. 20% each Si, M Ai) Packed, lump, carload 9c, t lots 9.25c, smaller lots 9.75c per alloy; freight not exceeding St. Lot rate allowed.

Tungsten Metal Powder: Spot, less than 98.8%, \$2.80, freight lowed as far west as St. Louis. Grainal: Vanadium Grainal No. 87.5c; No. 6, 60c; No. 79, 45c; fob Bridgeville, Pa., usual freig

allowance. Vanadium P. ntoxide, technie grade: Fused, approx. 89-92% Vy and 5.84% Na₂O; or air dried, 85% V₂O₃ and 5.15% Na₂O, 51, per 1b contained V₂O₃ fob ple freight allowed on quantities of 1b and over to St. Louis.

Nonferrous Metal Prices Hold Firm

NEW YORK - A steadier price tone developed in the major nonferrous metal markets last week following an advance on a broad front in the preceding period. A sharp decline was recorded in silver, however, due to withdrawal of Indian orders. Domestic supplies of copper, tin and lead remain tight while those of zinc 'are declining.

COPPER — Consumers will get about 30,000 to 35,000 tons of foreign copper COPPER this month from the dwindling government-owned stockpile. Since there were officially estimated to remain only 55,-000 tons of foreign copper in the stock-pile at the beginning of the month, only about 20,000 to 25,000 tons will be left

for allotment in April and later.

The House Ways & Means Committee last week reported out the Patterson bill which would suspend the import tax on copper until Mar. 31, 1950. Western congressmen oppose the bill in its present form but are not expected to muster enough strength to defeat it. They favor

In reporting, the committee said that the current shortage in domestic copper supplies is extremely serious. In 1946 production of refined metal from domestic sources totaled about 604,000 tons, or 240,000 tons below the amount produced in 1945 while deliveries totaled about 1,261,000 tons. The difference, namely 657,000 tons, had to be supplied from government-owned stocks purchased and stockpiled without payment of import taxes. Government-owned stocks of copper in the hands of the Office of Metals Reserve have been reduced to 55,000 tons as of Mar. 1, or to less than one-half of one month's requirements. During April. the committee said, government stocks of copper are expected to be completely exhausted and domestic consumers will then become entirely dependent upon domestic production and current imports.

"Estimated domestic production of refined copper for 1947 is placed at approximately 950,000 tons maximum," the committee said. "Domestic consumption for the same period is estimated at 1,400,-

Copper well established at 21.50-cent level . . . Silver prices slump . . . Domestic supplies remain tight

000 tons. The minimum deficit of 450,-000 tons must, therefore, come from private imports of copper. Current imports of copper are negligible largely because the world price of 22.85c per pound ex-ceeds the domestic price of 21.50c. . . . Temporary removal of the import-taxes for a three-year period. . . should clear the way for increased imports of copper while domestic producers are catching up with the domestic market.

The domestic market now is fully established at the 21.50-cent level. Kennecott Copper Corp. is now pricing its shipments on the basis of 21.50c, delivered Connecticut valley, which is the same level that has been prevailing in other domestic producing and refining sources for the past few weeks.

LEAD—Demand for lead continues active but new orders are restricted due to the sold-out position of several interests. One large seller has disposed of the tonnage for March and had not opened April books up to late last week. The price of lead concentrates was increased \$14.40 a ton last week to \$195.65 a ton on a metal contract basis, which brings the price to a new all-time high. The new price eliminates premiums for over-quota production of lead. Lead is quoted on the basis of 14.80c to 14.85c, East St. Louis.

Lead was placed under control in Australia leat week. The convenient of the lead was placed under control in Australia leat week.

tralia last week. The commonwealth has undertaken to supply Great Britain with a maximum quantity of the metal to meet the acute supply position there and at the same time assist in the dollar situation. Australia is augmenting her dollar funds by exporting lead to the United States.

ZINC-Production of zinc declined in

February to 65,198 tons from 72,332 to in January, due to the shorter mon since the daily rate held at 2329 to Shipments were also lawer at 65,3 tons compared with 67,211 tons in Jauary, but on a daily basis showed increase. Stocks as of the end of Feruary showed a further decline of 1 900 tons to a total of 162,461 tons. Util 100 tons to a total of 162,461 tons. filled orders at the end of February was about unchanged from the previous month, totaling 57,081 tons.

TIN—According to cables received last week, the Bolivian Provisional greenment has signed a five-year transfer. ernment has signed a nve-year tree pact with Argentina under which B via agrees to sell to Argentina la quantities of tin, lead, antimony, w fram and rubber, while Argentina agr to sell Bolivia food products suffici for normal needs. Argentina also agr to grant Bolivia a credit of \$62,500,6 to selled improvements and integral. for railroad improvements and irrigat projects.

The pact calls for the purchase Argentina of the equivalent of 8000 to f fine tin for 1947 delivery from Bar Minero, at a settlement price of 76.0 fob Antofagasta, Chile.

fob Antofagasta, Chile.

SILVER—Precipitous decline in sil prices continued last week with price here dropping to 75.75c per founce compared with a recent high 86.50c. The decline is attributed to fact that the Indian government placed a ban on imports, which remothe incentive for large scale purchahere for ultimate shipment to Inc.

ANTIMONY—Antimony users longer are required to specify any partitions.

longer are required to specify any parti-lar grade in seeking allocations. Civil Production Administration announ last week. This requirement was life because no assurance could be had t because no assurance could be had to any particular grade will be more pleful than others. The agency also elimated the provision by which antimony and concentrates could be delivered producers up to 50 tons of contain antimony during any calendar mowithout allocation.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 ib to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 19.25c-21.25c, refinery, 20,000 lb or more; 19.50c-21.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 21.50c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 24.50c; No. 1 yellow (No. 405) 17.00c; carlot prices, including 25c per 100 lb freight allowance; add 4c for less than 20 tons.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb,

Secondary Aluminum: Piston alloy (No. 122 (ype) 16.37½c; No. 12 foundry alloy (No. 2 grade) 15.62½c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 17.00c; grade 2 (92-95%) 16.00c; grade 3 (90-92%) 15.25c; grade 4 (85-90%) 14.75c. Above prices for 30,000 lb or more; add ½c 10,000-30,000 lb; ½c 5000-10,000 lb; %c 1000-5000 lb; 1½c less fhan 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots: 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights), 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c. Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 28.25c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 28.75c. On producers' sales add %c for less than carload to 10,000 lb; %c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "fr" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, \$86-\$90 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, \$14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms \$1.50-\$1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, \$1.55-\$1.80.

Cobalt: 97-98%, \$1.50 lb for 550 lb (keg); \$1.52 lb for 100 lb (case); \$1.57 lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

ladium: 99.9%, \$2.25 per troy ounce.

Silver: Open market, N. Y., 75,75c per ounce

Platinum: \$57-\$61 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$110 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21,50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; Yellow brass 28 88c; commercial bronze, 95% 32.97c, 90% 32.36c; red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., coid-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29 28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 25.52c-27.72c, less carlots 26.02c-28.22c; weatherproof, fob eastern mills carlot 26.42c-28.12c, less carlots 26.92c-28.62c; magnet, delivered, carlots 28.93c-31.13c, 15.000 lb or more 29.18c-31.38c, less carlots 29.68c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70e	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	. 26"-48"	24.20c	27,00c
13-14	26"-48"	25,20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq. ft. or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq. ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq. ft and circles. Pipe: Full colls 17.50c; cut colls 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in colls, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.25-13.50c; over 12-in., 14.25-14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads, 20.00c; 5 tons and over, 25.00c; 1 to 5 tons, 21.00c; less than 1 ton, 21.50c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval, over 15 in., 36.87½c; flat untrimmed, 36.87½c; electrodeposited, 30.62½c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels, nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls, 41.50c fob Niagara Falls.

Sodium Cyanide: 96-98%, ½-0z balls, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Cast and rolled carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 30,000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 22.00c.

Tin Anodes: Bar, 1000 lb and over 82.50c; 500 to 1000 lb, 83.00c; 200 to 500 lb, 83.50c; less than 200 lb, 84.00c; ball, 1000 lb and over, 84.75c, 500to 1000 lb, 85.25c, 200 to 500 lb, 85.75c; less than 200 lb, 86.25c, fob Sewaren, M. I.

Tin Chloride: 400 lb bbls, nom., fob Grasselli, N. J.; 100 lb kegs, nom.

Sodium Stannate: In 100 or 200 lb drums, 49.00c; 4 to 11 kegs, 47.00c; 12 to 20 kegs, 44.30c; 21 kegs and over, 43.50c; in 350-lb bbl, 46.50c; 4 to 5 bbls, 43.80c; 6 bbls and over, 43.00c; fob Chicago, freight allowed east of Mississippi on 100 lb and over.

Zinc Cyanide: 100-lb drums, 35.00c, fob Cleveland: 34.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add %c for 15,000-40,000 lb; 1c for 40,000 or more.

		Clean Heavy	Rod Ends To	
Copper		19.125	19.125	18.375
Yellow t	orass	15.125	14.875	14.250
3	ai-1 Decem			

95%	 17.625	17.375	16.875
90%	 17.500	17.250	16.750

Red brass

85%	17.250	17.000	16.500
80%	17.000	16.750	16.250
Best Quality (71-79%).	16.125	15.875	
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16,125	15.875	8.063
Phos. bronze, A. B	20.000	19.750	18.750
Naval brass	14.500	14.250	7.250
Manganese bronze	14.500	14.250	13.375

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 16.75, auto radiators 13.25, heavy yellow brass 12.00, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.25-19.50; No. 2 copper, 17.75-18.50, light copper 16.75-17.50; refinery brase (60% copper), per dry copper content less \$5 smelting charge for brass analyzing 60 per cent or more, 17.62\%c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15 50-16.00; light copper 14.25-14.75; No. 1 composition red brass 14.25-14.50, No. 1 composition turnings 14.00-14.25, mixed brass turnings 9.50-10.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 11.75-12.25, light brass 850-9.00, heavy yellow brass 9.75-10.00, new brass rod ends 12.00-12.50, auto radiators, unsweated 11.50-12.00, clean red car boxes 12.50-13.00, cocks and faucets 11.25-11.50, brass pipe 11.00-11.50.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linetype and stereotype 13.50-14.00, electrotype 11.50-12.00, mixed babbit 12.00-12.50, solder, joints 13.50-14.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-38.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, turnings 3.00, pistons, free of struts, 6.75-7.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15 00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted

from remote including \$7	points	range up	
No. 1 Heavy No. 2 Heavy			\$38.00 38.00

PITTSBURGH:

No. 1 Heavy Melt. Steel	\$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1/2 & 3 Bundles.	38.00
Machine Shop Turnings	32.50-33.50
Mixed Borings, Turnings	32.50-33.50
Short Shovel Turnings.	34.00-34.50
Cast Iron Borings	30.50-31.50
Bar Crops and Plate	38.50-39.50
Low Phos. Cast Steel	40.50-41.50
Punchings & Plate Scrap	40.50-41.50
Elec. Furnace Bundles.	37.50-38.50
Heavy Turnings	35.50-36.50
Alloy Free Turnings	35.50-36.50
Cut Structurals	41.50-42.00
No. 1 Chemical Borings	34.50-36.50

Cast Iron Grades

No. 1 Cupola. Charging Box Cast Heavy Breakable Cast. Stove Plate Unstripped Motor Blocks Malleable Brake Shoes Clean Auto Cast. No. 1 Wheels	43.50-44.50 39.00-39.50 37.50-38.50 43.50-44.50 42.00-43.00 46.00-47.00 32.00-35.00 47.00-42.00
Clean Auto Cast No. 1 Wheels Burnt Cast	

Railroad Scrap

No. 1	R.R. Heavy Melt.	38.00
R.R. 1	Malleable	48.00-50.00
Axles		43.00-46,00
Rails,	Rerolling	41.00-42.00
Rails,	Random Lengths	37.00-40.00
Rails.	3 ft and under.	39.00-42.00
Rails,	18 in, and under.	40,00-44,00
Railroa	ad Specialties	41,00-45,00
Uncut	Tires	40.50-42.50
	. Splice Bars	39.00-44.00

CLEVELAND:

Prices for steelmaking grades from remote points range several dol-lars per ton higher, depending on freight charges.

No. 1 Heavy Melt, Steel	\$37.50
No. 2 Heavy Melt. Steel	
No. 1 Busheling	37.50
Nos. 1 & 2 Bundles	37.50
Machine Shop Turnings	31.00
Mixed Borings, Turnings	32.00
Short Shovel Turnings	32.00
Cast Iron Borings	32.00
Bar Crops and Plate	40.00-45.00
Cast Steel	40.00-45.00
Punchings & Plate Scrap	40.00-45.00
Flac Flate Scrap	
Elec. Furnace Bundles.	40.00
Heavy Turnings	36.50
Alloy Free Turnings	31.00
Cut Structurals	40.00-45.00
No. 1 Chemical Borings	33,00
Pier a continued Dollings	55,00

Cast Iron Grades

No. 1 Cupola	46.00-50.0
Charging Box Cast	42.0
Stove Plate	45.0
Heavy Breakable Cast.	44,00-46 0
Unstripped Motor Blocks	45.0
Malleable	50.0
Brake Shoes	43 N
Clean Auto Cast	50.00
No. 1 Wheels	43.0
Burnt Cast	42.0
	324.0

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00-50.00
Rails, Rerolling	48,00-50.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	50.00
Railroad Specialties	45.00
Uncut Tires	44.00
Angles, Splice Bars	48.00

VALLEY:

Prices for steelmaking grades from remote points range several dol-lars per ton higher depending on freight charges.

No. 1 Heavy Melt, Steel	\$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Bundles	38.00
Machine Shop Turnings Short Shovel Turnings.	33.00
Cast Iron Borings	34.00 34.00
Cast Holl Dorlings	34.00

Railroad Scrap

1 R.R. Heavy Melt. 38	3.0
-----------------------	-----

MANSFIELD:

Prices	for	steel	mal	king	grad	es 1	rom
					seve		
lars	per	ton	high	er,	deper	nding	gon
freig	ht c	harg	es,				
No. 1	Hear	vv M	eìt.	Stee	[د	83	8.00

Short Shovel Turnings 35.00	No. 1 Heavy Melt. Steel Machine Shop Turnings Short Shovel Turnings	\$38.00 33.00 35.00
-----------------------------	---	---------------------------

CINCINNATI:

No.

No. 1 Heavy Melt. Steel No. 2 Heavy Melt. Steel No. 1 Busheling No. 1 Bundles No. 2 Bundles	36.00 36.00
Machine Shop Turnings. Mixed Borings, Turnings	26.00 24.00
Short Shovel Turnings. Cast Iron Borings	27.00 27.00

No. 1 Cupola Cast	43.00
Charging Box Cast	36.00
Heavy Breakable Cast.	38.00
Stove Plate	33.00
Unstripped Motor Blocks	35.00
Brake Shoes	30.00
Clean Auto Cast	41.00
Cicuii aluto Cust IIIII	

Railroad Scrap

No. 1	R.R. Heavy Melt.	36.00
R.R.	Malleable	45.00
	Rerolling	40.00
Rails.	Random Lengths.	40,00
Rails,	18 in. and under.	45.00

DETROIT:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	\$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings.	26.00-26.50
Mixed Borings, Turnings	26.00-26.50
Short Shovel Turnings	27.00-27.50
Cast Iron Borings	27.00-27:50
Punchings & Plate Scrap	37.00-38.00

Cast Iron Grades

No. 1	Cupola Cast	\$39.00-42.00
	Breakable Cast.	
Clean	Auto Cast	39.00-42.00

BUFFALO:

No. 1 Heavy Melt. Steel	\$35.00
No. 2 Heavy Melt. Steel	35.00
No. 1 Busheling	35.00
Nos. 1 & 2 Bundles	35.00
No. 3 Bundles	30.00-31.00
Machine Shop Turnings	28.00-29.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings.	30.00-31.00
Cast Iron Borings	27.00-28.00
Punchings & Plate Scrap	36.00-38:00
Elec. Furnace Bundles.	35.50-36.50
Alloy Free Turnings	33.00-34.00

Cast Iron Grades

No. 1 Cupola Cast	38.00~42.00
Charging Box Cast	36.50-38.50
Stove Plate	38.00-40.00
Malleable	40.00-42.00
Clean Auto Cast	38.00-42.00
No. 1 Wheels	38.00-40.00

PHILADELPHIA:

No. 1 Heavy Melt. Steel	\$38.50-40.00
No. 2 Heavy Melt. Steel	38.50-40.00
No. 1 Busheling	38.50-40.00
No. 1 & No. 2 Bundles.	38.50-40.00
No. 3 Bundles	35.50-36.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	29,00-30,00
Cast Iron Borings	29.00-30.00
Bar Crops and Plate	43.00-44.00
Cast Steel	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Elec. Furnace Bundles	40.00-41.00
Heavy Turnings	39.00-39.50
Cut Structurals	43.00-44.00
No. 1 Chemical Borings	36,50-37,00

Cast Iron Grades

No. 1 Cupola Cast	50.00
Charging Box Cast	46.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	44.00-44.50
Malleable	50.00-51.00
	50.00
No. 1 Wheels	48.00-49.00

NEW YORK:

(Dealers buying prices, fob

Cast Iron Grades

Charging 1	ola Cast Box Cast Motor Blocks	43.00-44.00 42.00-43.00 42.00-43.00 45.00-46.00
Maneable		45,00-46,00

BOSTON:

(Fob shipping point)

No. 1 Heavy Melt. Steel	\$33.00
	33.00
No. 1 Busheling	33.00
Nos. 1 & 2 Bundles	33.00
Machine Shop Turnings	25.00-26.00
Mixed Borings, Turnings	24.00-25.00
Short Shovel Turnings.	27.00-28.00
Bar Crops and Plate	33.00-34.00
Punchings & Plate Scrap	32.50-33.50
No. 1 Chemical Borings	25.00-26.00

Cast Iron Grades

5,00 1,00 1,00 1,00 5,00
,.00

CHICAGO:

Prices	for	stee	lma	king	grades	fr	om
					several		
lars	per	ton	high	her,	dependi	ng	on
freig	ht o	chars	res.				

No. 1 Heavy Melt. Steel	\$32.50
No. 2 Heavy Melt. Steel	32.50
Nos. 1 & 3 Bundles	32.50
No. 3 Bundles	30.50
Machine Shop Turnings	30.00-31.00
Mixed Borings, Turnings	30.00-31.00
Short Shovel Turnings.	32.00-33.00
Cast Iron Borings	32.00-33.00
Bar Crops and Plate	38.00-39.00
Cast Steel	38.00-39.00
Punchings	38.00-39.00
Elec. Furnace Bundles.	38.00-39.00
Heavy Turnings	35.00
Cut Structurals	38.00

Cast Iron Grades

No. 1 Cupola Cast Malleable Clean Auto Cast	42.00-45.00 42.00-45.00 42.00-45.00
Railroad Scrap	p

No. 1 R.R. Heavy Melt.	33.50
Rails, Rerolling	40.00-43.00
Rails, Random Lengths	40.00-43.00
Rails, 3 ft. and under	42.00-45.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	42.00-45.00
Angles, Splice Bars	42.00-45.00

ST. LOUIS:

No. 1 Heavy Melt. Steel \$35.50-36.50 No. 2 Heavy Melt. Steel 35.50-36.00 Machine Shop Turnings 27.25-27.75 Short Shovel Turnings. 29.25-29.75

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast 40.00-42.00 No. 1 Cupola Cast.....

Charging Box Cast... 30.00-35.

Heavy Breakable Cast.	30.00-32
Stove Plate	29,00-34,
Brake Shoes	28.75-31,
Clean Auto Cast	35.00-37
No. 1 Wheels	34.50-36.
Burnt Cast	25,00-30.

R.R. 1	Malleable	41.00-42.0
Rails,	Rerolling	40.00-42,0
	Random Lengths	39.00-42.0
	3 ft and under	40.00-43.0
	Tires	34.50-36.
Ingles	, Splice Bars	38.00-40.0

BIRMINGHAM:

No. 1 Heavy Melt. Steel	\$32.50-33.
No. 2 Heavy Melt. Steel	
No. 1 Busheling	
Nos. 1 & 2 Bundles	
Long Turnings	23.00-23.
Short Shovel Turnings.	27.50-28.
Cast Iron Borings	22.00-22.
Bar Crops and Plate	34.00-34.
Punchings & Plate Scrap	34.00-34.
Cut Structurals	34.00-34.

Cast Iron Grades

No. 1	Cupola	Cast		39.00-40.
	Plate Wheels			35.00-36, 38.00-39,
140. 1	AATICCIS		•	55.00-55.

No. 1 R.R. Heavy Melt.	29.50-30.
R.R. Malleable	37.50-38
Axles, Steel	35.50-36.
Rails, Rerolling	41.00-42.
Rails, Random Length.	33.00-34.
Rails, 3 ft and under	36.00-37.
Angles and Splice Bars	37.00-38.

SAN FRANCISCO

SIXIV EXCELVORSOO:	
	\$19
	19
	119
	*19
	17
	12
	18
Cast Steel	18
Alloy Free Turnings	
Cut Structurals 20.00	17

Railroad Scrap

	Random	Lengths.	. 21 . 21 28
-			

* Fob California shipping point.

SEATTLE:

No. 1 Heavy Melt. Steel
No. 2 Heavy Melt. Steel
No. 1 Busheling
Nos. 1 & 2 Bundles
No. 3 Bundles
Machine Shop Turnings
Mixed Borings, Turnings
Punchings & Plate Scrap
Cut Structurals

Cast Iron Grades

\$20.0 20.0 20.0 18.0 11.5 21.5 21.5

No. 1 Cupola Cast
Charging Box Cast
Heavy Breakable Cast.
Stove Plate
Unstripped Motor Blocks
Malleable
Brake Shoes
Clean Auto Cast
No. 1 Wheels

Railroad Scrap

No. 1 R.R. Heavy Melt Railroad Malleable Rails, Random Lengths Angles and Splice Bars

LOS ANGELES:

No. 1 Heavy Melt. Steel No. 2 Heavy Melt. Steel Nos. 1 & 2 Bundles ... Machine Shop Turnings Mixed Borings, Turnings

Cast Iron Grades

LOGEMANN

Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGE-MANN designs and workmanship.

The line includes scrap presses designed for mill Service, presses designed for automobile plant conditions, presses designed for general plant applications. Write for details.

LOGEMANN BROTHERS COMPANY
3126 W. Burleigh St. Milwaukee, Wisconsin

The scrap press illustrated eperates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.



Sheets, Strip . . .

Specialty sheets and strip. electrical and stainless, show improved supply

Sheet & Strip Prices, Page 142

New York—While major grades of sheets continue in tight supply, certain of the specialties including stainless sheets are easier. Whereas a half year or so ago, most producers were booked months ahead (where they weren't on a quarterly quota basis), most mills to-day can offer deliveries within two months. As a matter of fact, only one or two producers are now allocating tonnages on a quarterly basis. One factor in the decline is the limitation on the that would require substantial quantities of stainless sheets. Due to the housing program, many commercial projects have been restricted, and as far as the housing program is concerned, there is a relative-

program is concerned, there is a relative-ly limited demand for stainless, even in the kitchen fixtures for the reason that stainless is too expensive for the type of homes being built.

Also there is less pressure for electrical sheets since increased facilities for producing this item are beginning to have effect. Considerable demand is being held up, however, due to the severe shortage in other materials and manufacturing components.

manufacturing components.

Enameling stock continues exceedingly tight. Much of this, of course, is going into household applicances for which demand still exceeds supply. Galvanized sheets are also in short supply. Some warehouses here have little or no galvanized material in stock, with mills rationing their tonnage carefully.

Buyers of hot and cold-rolled sheets are not bearing down on their suppliers quite as heavily as they were, but this appears to be due almost entirely to their appreciation of the stringency

Boston—Uniformity in narrow cold strip prices is materializing. District producers are adopting card extras and reducers are adopting card extras and revised carbon ranges initiated by American Steel & Wire Co. This makes shoe shank steel, around 0.50 carbon, 4.90c, Worcester, Mass. By far the bulk of this grade is rolled in New England. Low carbon is 3.40c, Worcester; 0.60 to 0.80 carbon, 5.50c; 0.80 to 1.00 carbon, 7.00c; over 1.00 carbon, 9.00c. Second quarter sheet requirements for housing will approximate that of the first. Much of this proximate that of the first. Much of this volume is already scheduled and unless unforseen demand develops, this will in-terfere little with schedules.

Closer check on end-use is being made. Closer check on end-use is being made. Some cutbacks in May and June may result from increasing railroad carbuilding demand. Demand for special grade sheets, electrical, enameling and electrocoated zinc, is far in excess of prewar in this area. General Electric Co., Lynn, m this area. General Electric Co., Lynn, Mass., was confronted with temporary curtailment by shortage of silicon sheets, one supplying mill having lost production recently from light gas pressure. Some producers have lowered second quarter allocations of hot strip and sheets, and these quotas may be subject to further requires. One leading Pages to further revision. One leading Pennsylvania mill, ordinarily supplying sub-stantial tonnage to this territory, has re-duced shipments to all but three old ac-

Philadelphia - Sheets and strip are in

easier supply in certain specialties, notably stainless sheets and to some extent electrical sheets. Most producers of stainless sheets can promise shipments within a couple of months or so. While electrical sheets are far from plentiful, there is a definite improvement. However, the major items, such as hot and cold-rolled sheets and hot strip, continue in tight supply. In galvanized and enameling sheets, there appears to be no easing whatsoever.

Bethlehem Steel Co. has eliminated Bethlehem, Pa., as a basing point on alloy spring flats but still maintains that point as a base on alloy spring rounds. company's nearest production point on flats for the Philadelphia district is Buffalo, which means it will have to equalize with the Pittsburgh freight rate into this area to be competitive. Elimination of the Bethlehem base results in an increase of about \$5 a ton in the Philadelphía delivered price on the Bethlehem product.

Cincinnati-Sheet mills continue under constant pressure for early deliveries and heavier second quarter allotments. and heavier second quarter allotments. Production, meanwhile, is holding at the best levels of the year. Shipping problems are faced in the shortage of boxcars. Some tonnage, contrary to customers' preference, is being moved in open cars. Another expedient is to use auto trucks more extensively.

Birmingham — Demand for sheets, rather than easing off, gains slowly but steadily in this district with the general picture little changed from that evident for many weeks. Some requests for increased allotments are being made, but there is slight prospect of meeting

even present quota allocations.

St. Louis—Nearly six months' steady sheet production at or near capacity has made no inroads on order backlogs or demand for prompt delivery. Rolling schedules are seven to eight months behind and there is little prospect of gain. Books for 1947 remain in effect closed.

Steel Bars . . .

Bar Prices, Page 142

New York-Carbon bar producers are falling far short in meeting demands for small rounds and flats. Better headway is being made on larger specifications, but it appears doubtful if this will relieve the situation in small rounds for some time. Supply of small sizes prob-ably will not be brought into balance with demand for several months. This applies to cold-drawn carbon bars in a slightly lesser measure, for there is a disposition among sellers to book the second quarter on most sizes of cold-drawn bars. Delivery promises on alloy bars remain easy, ranging around four to six weeks for the hot alloy material, and only a little longer for the cold alloys. Stainless bars can be had in three to four

Stainless bars can be not in three to rou-weeks in some cases.

Boston — While some easing in car-bon bars in larger sizes is developing, small sizes are tight with second quar-ter quotas barely held to levels of the first three months. Bulk of the larger sizes is consumed by forge shops produc-ing automobile crankshafts. One forge shop formerly using die-rolled stock has changed to 4-inch square because of the cost factor. Forge shops and bolt and nut producers are short of smaller sizes. Hot-rolled bessemer stock supply also is limited for the second quarter. Tubular Goods . . .

Demand for large size pipe, particularly, fills mills' books into 1949

Tubular Goods Prices, Page 143

Pittsburgh — Producers of steel line pipe for oil and natural gas projects are booked into 1949 in some instances as a booked into 1949 in some instances as a result of pentup demand for increased crude oil facilities and the transition of natural gas from a luxury system of residential and commercial heating to a practical one. The most pressing demand is for large sized pipe, which is produced by comparatively few mills. Reflecting extended mill delivery promises for standard pipe, tubing manufacturers have had a number of requests to produce standard lighter weight pipe on tube mills with customers willing to pay premium up to \$50 a ton. A. O. Smith Corp., Milwaukee, one of the pipe producers heavan estimated 250,000 tons of steel pipe for the Michigan-Wisconsin Pipe Line Co.'s natural gas line from Northern Tex as to Detroit and Milwaukee. The mair line will be 26-inch pipe, and total length of system will approximate 1800 miles.

Boston—On most tubing classification mills are sold for balance of the year exceptions being stainless, chrome-moly and certain other alloys on which de livery is from six to eight weeks. Dis tributors' inventories of merchant steepipe are low and unbalanced with consumer demand heavy. Pipe mills los production because of gas supply troub les and in same instances, despite sucl les and in same instances, despite such losses, pipe backed up awaiting shipmen due to the shortage of railroad cars Considerable pressure for opening obooks for next year, notably by utilities is apparent. Utility buying promises the heavy in steel pipe, which has been the case in cast iron pipe of late. Prefabricators of pipe are booked through this year and have some tonnage committed for next year. Pipe volume avail able for direct shipment is small an several large inquiries remain unplaced. several large inquiries remain unplaced Light-wall invasion pipe from surplus

Light-wall invasion pipe from surplus being bought in considerable volume a a substitute. Harverhill, Mass., wan 30,000 feet, 6-inch steel pipe and in vasion pipe may be substituted. Industrial users of tubing still use substantial ratio of electric welded in stead of the usual light-wall bedstea grades; although higher in cost, mor of this type is available. There are scattered tie-in sales, involving alloy, and carbon, the latter being tight wit alloys relatively easier.

alloys relatively easier.

St. Louis—Demand for housing pip remains insistent and diversion of som capacity to unthreaded and uncouple pipe for railroad cars has tightened the situation. Around 10 per cent of capacit situation. Around 10 per cent of capacitis now going into the car building program and will rise to 15 per cent late. The added 5 per cent doubtless will be at the expense of building pipe. There has been frequent switching recently it tube production as makers of manufactured goods grow more cautious an occasionally hold up orders. These invariably are offset is confused by a feeling the confused by Tubing market is confused by a feelin among some consumer goods makers the the price-demand ceiling may have bee reached. Home construction has quiete lately because high costs are compellin redesigning.



NOWHERE has progress been more pronounced than in the development of farm tachinery... equipment in which special type nuts and bolts play an increasingly important part. A good example of this is the unique tractor bolt illustrated above... produced by the Buffalo Bolt Company.

Circle (a) nuts and bolts are noted for their niform size and strength. No matter what your requirements, the controlled quality of all Circle (a) products, standard or special, will enable you to improve your production efficiency and the stamina and reliability of the equipment you produce and sell.

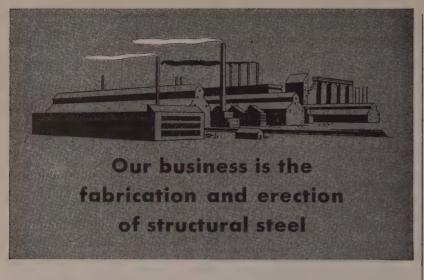


Did you know that Buffalo Bolt Company has designed and built many highly efficient nut and bolt making machines, one of which is illustrated,



BUFFALO BOLT COMPANY

NORTH TONAWANDA, N. Y. • SALES OFFICES IN PRINCIPAL CITIES Export Sales Office: Buffalo International Corp., 50 Church Street, New York City



- BRIDGES... Unexcelled facilities for the design, fabrication and erection of railway and highway bridges for industry, municipality, state and federal government,
- BUILDINGS . . . Fort Pitt Bridge has an outstanding reputation and long years of experience in designing, fabricating and erecting structural steel for industrial, commercial and public buildings.
- POWER PLANTS . . . Fort Pitt Bridge has played an important role in the fabrication and erection of structural steel for many of America's largest power plants.
- institutions . . . research laboratories, hospitals, local, state and federal buildings all over America stand as memorials to the master craftsmanship, integrity and wide experience of the Fort Pitt Bridge organization.
- YOUR JOB . . . when entrusted to Fort Pitt Bridge gets an extra-measure of skill, experience and "know-how" plus prompt, planned delivery, accurate workmanship and service.

"Steel Permits Streamlining Construction with Safety, Endurance and Economy."



FORT PITT BRIDGE WORKS

Member American Institute of Steel Construction

General Offices, Pittsburgh, Pa. ... Plant at Canonsburg, Pa.

NEW YORK, N.Y. 441 Lexing

BRANCH OFFICES
Avenue WASHINGTON, D.C.
Building DETROIT, MICHIGAN
NIK Bldg. PHILADELPHIA PA

New Center Building
Commercial Trust Bldg

Plates . . .

Plate Prices, Page 143

New York—Little or no improvement is noted in plate supply, many producer being out of the market. Those where have not been quoting on a quarterly quota basis are booked so far ahead the are no longer interested in accepting new business; those on a quarterly quot basis are booked up solidly for the second quarter and are refusing to accept business for shipment beyond. In factivarious mills have been cutting bacon orders already entered. One easter mill does not plan to accept any mor tonnage until next fall and then on for shipment in 1948. Consumers ar turning more and more to jobbers, only to be disappointed in many instance due to unbalanced stocks. Various manufacturing consumers of plates are curtailing operations because of inability aget sufficient quantities of steel. The caprogram is imposing an additional burde on the mills and at the expense of fabricators of other types of equipment.

get suncient quantities of steel. The eprogram is imposing an additional burde on the mills and at the expense of fabricators of other types of equipment.

Boston—Heavy buying of floor plate has built up order backlogs and extende deliveries into the fourth quarter wit some mills. Part of this demand develops from fabricating floor plates for en use normally filled by plain carbo plates. Due to the higher cost, som large individual orders result. No ir crease in carbon plate tonnage, especiall in small gages, is in sight and heav freight car requirements by May wifurther restrict allocations to plate shop and other users. Inquiry for 4-ine plates is notably strong. Demand for small underground tanks up to 3000-gal lon capacity is sustained at a high leve Pressed heads and flanged work, available in June in more standard sizes, are easier than spun heads on which deliver is extended to October in sizes 60-inche and over.

Philadelphia — Plates are in tight supply a number of producers being virtually out of the market. Where they are selling on a quarterly quota basis they are booked to the end of the second quarter and are accepting nothing for shipment beyond; where they are not on such a basis, the majority are booked sefar ahead they are refusing to take any thing more, in fact, in some cases the have cut back substantially on tonnag already entered. Operating difficultie continue to handicap most eastern plat producers, although one mill resume rolling last week after having been forced to suspend entirely due to gas shortage. It is doubtful if most eastern plate mill are rolling at better than 50 to 60 pecent of capacity, due primarily to ray material shortages.

Birmingham—As has been the case in this territory for many months, plate are second only to sheets in point of insistent demand and general unavailability. As a matter of fact, the district is known to have lost a considerable fabricating order last week because of inability to deliver which in turn was attributable to shortage of plates. Milliare still well behind on commitments.

Seattle—Demand for plates is strong but no major projects are up for figures.

Seattle—Demand for plates is strong but no major projects are up for figures Plants are operating under material limitations but there is a good run of small jobs, mainly tank and boiler contracts. An unstated tonnage is involved in a tank installation at the Blitz-Weinhard brewery, Portland, Oreg., for which the general contract has been awarded

Wire Prices, Page 143

Wire Prices, Page 143

Boston—Scattered deferments in wire orders result from unbalanced inventories, but demand is maintained at high levels with no easing in the overall situation. Rod supply with nonintegrated mills remains short with finishing operations restricted and subject to revision. One eastern producer is offering spot lots, mainly lower carbon drawn wire, in slightly heavier volume, but there is no increase in rod offerings. Rod producers are rolling a higher ratio of their own production or gearing semifinished output closer to finishing schedules. A textile mill equipment builder has cutback on springs in line with revised schedules based on availability of other materials. Screw and small fastening manufacturers' stocks are out of balance as to sizes and grades in both rods and drawn wire.

Chicago—All wire and wire products, excepting wire rope, are tight. Consumers are vainly seeking increased allotments from the mills. In virtually all instances, delivery is of more importance than price.

portance than price.

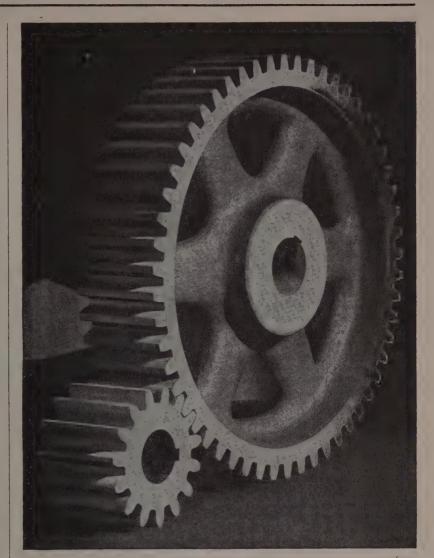
Birmingham - Wire products, so far as jobbers and users are concerned, continue as a hand-to-mouth proposition in this district. Jobbers report a month-in this district. Jobbers report a month-in and month-out program of apportioning the comparatively few tons they get, especially in wire fencing and nails, while mills still are unable to meet re-quirements for drawn wire from the varied small industries of this section.

Tin Plate . . .

Tin Plate Prices, Page 143

Pittsburgh—Size restrictions on tin and terne plate cans have been dropped, through amendment to M-81 effective Mar. 7. Demand for electrolytic tin plate has increased substantially in re-ent weeks reflecting discontinuance of regulations governing use of tin contain-ers for packaging certain products; crown caps also can now be tin coated. Tin plate demand from general line can man-facturers is expected to far exceed sup-ply throughout 1947. This deficit may be offset somewhat through lessened requirements from perishable food packers. Unfavorable weather has damaged citrus ruit crops in some areas, while packers ruit crops in some areas, while packers are becoming increasingly concerned over act present high prices for many fruits low packed have slowed up sales of hese items considerably. Manufacturers of containers report tin plate invenories well below normal with result disribution of their container output is un-ler strict allocation. Mills have been ard pressed making scheduled deliveries lue to critical shortage of box cars and

Chicago—Demand for tin plate mainains its lead over supply, and no im-rovement in this situation seems likely a the foreseeable future. Consumers re specifying against their second quar-er allotments and April schedules are ow filled. There is considerable pres-ure for tonnage in excess of allotments, with mills helpless to accommodate. An adication of low stocks in users' hands a the more frequent emergency situa-some which arise. Boy car supply is reaons which arise. Box car supply is rea-onably adequate to move out producion, although a critical shortage could evelop on short notice.



Buy HORSBURGH AND SCOTT RUGGED and DEPENDABLE

* Now, when time and working hours are really important, it pays more than ever before to buy gears that will stand the "gaff". Horsburgh & Scott Gears are accurate...husky... built to endure ... "steel muscled" for hard work. You'll find proof in their performance and long, uninterrupted service.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE . CLEVELAND, OHIO, U.S. A.

Structural Shapes . . .

Structural Shape Prices, Page 143

Pittsburgh—Outlook for more lenient approval of nonhousing construction apapproval of nonhousing construction applications by government officials is brightening, reflecting gradual easing in some building materials supply. Maximum weekly valuation of nonhousing construction applications that can be approved on nation-wide basis has been increased from \$35 to \$50 million. However, fabricators are well behind production schedules due to persistent shorttion schedules due to persistent shortage of shapes and plates, and this problem is expected to be further accentuated by the sharply augmented freight car construction program for which the mills

have made definite steel commitments. Mill distribution of shapes and plates remains on an allocation basis, with producers claiming they could easily fill order books for balance of this year if they were to book all tonnage offered. Heavy pressure is reported by producers for production of material going into direct fabrication because they are so far behind on commitments. Some observers believe this situation will result in less structural shipments for warehouses.

New York — Veterans' hospital work continues a feature of the structural market. In addition to a hospital at Fort Hamilton, Brooklyn, N. Y., involving 6600 tons and up for re-bids Mar. 17, another hospital near Newark, N. J.,

is expected to be up for figures shortly is expected to be up for igures shorty involving a similar tonnage. In addition another hospital is proposed for Ne York city, and still another for Syracus N. Y., each requiring several thousan tons. All work will be handled through N. Y., each requiring several thousant tons. All work will be handled through the United States Engineering office Demand in general, however, is rather slow, pending stabilization of costs. It cluded in the few outstanding award to be noted recently are 700 tons for plant addition to the American Brak Shoe Co., Niagara Falls, N. Y., and 30 tons for a building for the Columbi Cable Co., Trenton, N. J.

Boston—Freight car requirements will cut into structural mill distribution beginning next quarter through demand fersills and special car sections. Secon

sills and special car sections, Secon quarter mill space is already taken an allotments to fabricators and distributor probably will be subject to revision. Mor extent of plain material quotas and cor siderable tonnage has been booked which has not yet been scheduled by mill has not yet been scheduled by mill Any sharp reduction in allocations mighthave a major effect on fabricating operations. Inquiry for fabricated structurs steel, despite high prices, holds fairl well. Some tonnage is moving for export at 4.30c a pound for plain material.

Philadelphia—While a few sizable job

are pending, structural demand is light with few inquiries and orders small. How ever, CPA approvals for this district con tinue to run well in excess of rejections a trend that has been in evidence fo some time and which will be reflected in some time and which will be reflected increasing structural activity in comin weeks, especially if construction cost show any signs of stabilizing. Leading fabricators have several months work of their books, but report difficulty in obtaining an adequate supply of shapes and plates, The situation in plates is par ticularly tight. On the other hand, ba steel is in somewhat easier supply. No only is this true of the larger bar sizes but of the medium sizes as well.

Seattle—Fabricating shops are hand capped severely by material shortage: Mill allocations of plain materials ar inadequate and deliveries are behin schedule. Consequently plants are cautious in making commitments. The situation is not expected to be normal until the six between

late in the year.

Birmingham—Pressure for shapes ha diminished somewhat on a broad front is this territory. Contributing to this the two-fold fact that a considerable volume of building is in the waiting stage and a good program of concrete and all the stage of the minum construction is under way. Miscel laneous use of shapes, however, is consistent and widespread.

Ferroalloys . . .

Ferroalloy Prices, Page 145

New York — Rising cre costs have forced further revisions in prices of ferro tungsten and tungsten powder, Electr Metallurgical Sales Corp., New Yorl announced Mar. 11. The new price are effective Apr. 1. on a contract basi and were effective at once on spo prices. The increase in ferrotungsten in 10 cents per pound of contained tung sten, which, will make the new easter cone contract price \$2.08 in late of 10. sten, which will make the new easter zone contract price \$2.08 in lots of 10 000 pounds or more of contained tung sten. Tungsten powder prices were in creased 15 cents a pound for the meltin grade, bringing the new spot price u to \$2.80 in the eastern zone in lots of 1000 pounds or more.



Reinforcing Bars . . .

Reinforcing Bar Prices, Page 142

Pittsburgh—Mill shipments remain under strict allocation, and represent but a small proportion of overall requirements. Output of reinforcing bars exceeds that recorded during closing months of last year and is estimated to be comparable with average monthly output during 1939. However, demand is more than double that experienced in 1939, with result many new inquiries must be rejected. Production schedules have been adversely affected by industrial gas shortage. Sellers continue to limit deliveries within a short radius of production points, unless customer is willing to absorb freight.

New York—While several sizable jobs are pending, there is some improvement in reinforcing bar orders. One of the larger noted recently involves 1800 tons for a veterans' hospital, Peekskill, N. Y., placed through Merritt-Chapman & Scott, with Bethlehem Steel Co.

with Bethlehem Steel Co.

Philadelphia — Reinforcing steel is in slightly better supply and demand is more active, involving several sizable tonnages. Outstanding inquiry involves 3200 tons for sewage disposal work for this city, bids opening Mar. 25, while a leading award involves 1000 tons for power plant work for the Philadelphia Electric Co. at Norristown, Pa., in addition to the 4500 tons of shapes recently placed. State highway work is requiring an increasing amount of tonnage, Pennsylvania requirements recently averaging around 500 tons a week.

Scattle—In spite of scrap shortages, steel mills are supplying rolling mills with sufficient semifinished material to maintain a steady rate of operations. Reinforcing bar sellers are giving preference to local contractors and regular customers. Inquiry is strong and many small jobs are being booked.

Warehouse . . .

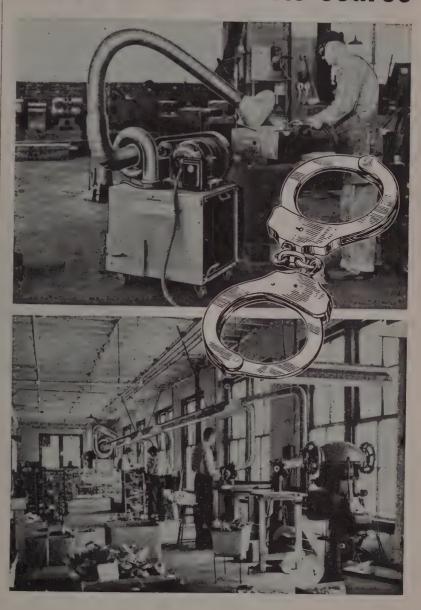
Warehouse Prices, Page 145

Boston—To meet heavy demand for stainless sheets, warehouses have substantial stocks, but only in this product are inventories sufficient to meet demand for light material. Giving most concern to distributors is their inability to get firm orders on mill books for second quarter for steels in greatest demand, including flat-rolled, light shapes and plates, wire products and strip. Orders for floor plates are substantially heavier. Buyers of alloys and stainless products trequently make supply of certain carbon steel items a contingency for orders which some sellers are unable to meet.

Cincinnati—Warehouse inventories in sheets, plates, small bars and structurals continue depleted, mill replacements being exhausted as soon as received. Demand is far in excess of supplies which have shown no upturn in recent weeks.

Seattle—Jobbers report demand is solding steady in spite of the higher price schedules. All out-of-stock items are in good demand but inventories are badly broken and below normal. Sheets, sails and pipe, black and galvanized, sontinue critical and no relief is expected in the near future. Reinforcing are are in short supply and other items are easier and permit a steady flow to he job.

Handcuff dust at its source



DUST on the loose breeds trouble. Workmen, machinery, plant and product—all are handicapped where process dust is not controlled.

The Roto-Clone system of dust control picks up dust-laden air at its source, separates the dust, delivers the collected material to storage hopper or disposal point and expels the clean air all in a single operation—with one moving part. It's compact, requiring minimum space—costs less to install because location at or near source of dust eliminates long pipe lines and expensive outdoor dust collectors.

Roto-Clones are available in a size and type to handle dust separation efficiently

over a wide range of particle sizes and specific gravities. There's an experienced American Air Filter representative in your area. He has seen many dust problems that were "different"—and solved them with Roto-Clones. Write today for complete information.



American Air Filter Company, Inc.

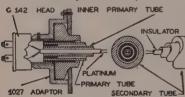
In Canada: Darling Bros., Ltd., Montreal, P. O.



Thirty-three years of experience and "know-how" go into the production of Gordon Platinum, Platinum-Rhodium Thermocouples. From this experience has evolved the Gordon policy which calls for the utmost in quality and service, the utmost in value to clients. That is why Gordon platinum wire is carefully checked for thermocouple accuracy against a master thermocouple . . . calibrated and certified by the National Bureau of Standards

The porcelain insulation and protecting tubes which go into a complete thermocouple assembly are of the finest quality obtainable. They are the best known means of preventing contamination of the elements

which result in false e.m.f. values. Also, the Gordon G-142 head which goes into a complete thermo-



couple assembly is light in weight and permits easy replacement of new elements into a protecting tube assembly.

The Gordon Policy—highest quality and standards of material—plus Gordon craftsmanship at the lowest possible price.

Write now for full information and price list.



CLAUD S. GORDON CO.

Specialists for 33 Years in the Heat Treating and Temperature Control Field

Dept. 14 • 3000 South Wallace St., Chicage 16, Nt. Dept. 14 • 7018 Euclid Avenue • Cleveland 3, Ohio

Scrap . . .

Scrap Prices, Page 148

Pittsburgh - Some improvement in scrap supply is indicated over the next 60 days reflecting efforts of government officials and industry representatives to stimulate collection and preparation programs. Exclusive of tonnage that might be returned from overseas, an estimated 1.3 million tons of scrap from government agencies will be made available this year through concerted collection drives; primarily from WAA surplus machinery and salvaging of ships. Present high prices also should encourage more widespread collection of remote scrap. Scrap movement into this district has improved slightly and at prices ranging up to \$44 for steelmaking grades. Local open-hearth scrap is delivered to mills here at \$38, up \$3 from previous price level. Producers were forced to raise their offering price because some tonnage was leaving this district, being sold on an fob Pittsburgh base for shipment to Some mills have temporother areas. arily withdrawn from the market in effort to prevent further upturn in prices and in protest to present high prices.

The entire scrap market remains in an extremely sensitive state, and it is difficult to determine a representative price spread on some grades coming largely from outside districts. There also is a considerable price spread on railroad scrap, notably along specialty items. Some railroads report bids of as high as \$44 for heavy melting scrap. Sale of open-hearth scrap at \$44 delivered here was reported last week for material originating in New England on a \$7.75 reight; short shoveling turnings from Connecticut were shipped to Monessen, Pa., at a delivered price of \$37.25.

Considerable scrap tonnage is coming into this district at well below \$44 de livered, on basis of tie-in sales with mill customers. Excessive competition for available supply rather than an actual shortage is believed to be major influence habind the steady upward trend in scrap prices.

Philadelphia - While prices on steel mill grades are unchanged, with the major items still holding at \$38.50-\$40.00, delivered, the scrap market is still bouyant, and in some lines further gains have been registered. Mixed borings and turnings are now \$29-30.00, and bar crops and plate, cast steel, punchings and plate scrap and cut structurals, \$43-44.00, and heavy turnings, \$39-39.50. Most cast grades are unchanged, although clean auto cast has been stepped up to \$50.00, delivered, and No. 1 wheels to \$48-49.00.

New York-Scrap prices have undergone a further general advance, with brokers encountering difficulty in covering on contracts. They are now offering \$36.50 to \$37, fob shipping point, for No. 1 and No. 2 heavy melting, No. 1 busheling, and No. 1 and No. 2 bundles; \$34.50 to \$35, No. 3 bundles; \$37.50, machine shop turnings and mixed borings and turnings; \$39.50, short shovel turnings; \$39.50, warchings and turnings; turnings; \$39.50, punchings, plate scrap and cut structurals; \$38 to \$38.50, elec-tric furnace bundles. No. 1 cupola cast is now \$43 to \$44; charging box cast, \$42.50 to \$43; unstripped motor blocks, \$42 to \$43; malleable, \$45 to \$46.

Boston—Steelmaking grades of scrap are not stabilized at the higher levels, heavy melting having advanced another \$1 to \$33 last week, paid by district and outside consumers. This is \$8 ton over the temporary leveling-off price which was established soon after price controls were dropped. Scrap shipment are substantial, especially to Pennsy vania, and higher prices apparently hav brought out scrap in slightly heavie volume. Cast grades are strong.

Buffalo—New business in scrap habeen reduced to a minimum here as lo cal consumers have refused to pay more than \$35 for No. 2 heavy melting mate rial even though outside buying is reported at least \$2 above the quote range. Pronounced strength continue to dominate the market. Local consumers likewise lost out on railroad offering as midwest buyers bid in the neighbor hood of \$44 for specialties which con pares with \$37 here. Cast scrap, in lin ited supply, is reported changing hand at fabulous figures. Although quoted \$40 a ton in the regular market, truck leads in small quantities, are reporte moving as high as \$50 a ton.

Detroit — Students of the scrap market profess to sense factors which could be a support of the scrap market profess to sense factors which could be a support of the scrap market profess to sense factors which could be a support of the scrap market profess to sense factors which could be a support of the scrap market.

make for stability or perhaps even a brea in prices, but they refuse to predict how soon. The outlook stems chiefly from prospects for improved supply in the weeks ahead. Meanwhile prices are shade higher, with steel grades quote

\$34.50-\$35.00.

Cleveland—Scrap prices in this ditrict have been established firmly shigher levels for local material on the basis of \$37.50 for heavy melting stee a range of \$40 to \$45 for low phose an \$46 to \$50 for No. 1 cupola cast. the same time, shipments from remot points are on the basis of \$38.50 with th buyers, in the case of steel mills, reserving the right to have shipments diverte to Youngstown or other points. Althoug scattered transactions are being made price above quoted levels, mills are picking up some material from their cu

tomers at prices below quoted level Cincinnati — Prices of iron and stee scrap, in a fluctuating and usettle market, are higher. Resistance to the higher quotations is encountered in som spots while in others fantastic biddin has been done in choice lots.

Birmingham - Scrap shipments hav improved somewhat under the stimulu of higher prices, although the general supply situation is described as critical Published prices remain unchanged, but instances are reported of premium payments of \$1 a ton and better on some produce area in the content of the product of grades, especially heavy melting and No 1 cast. Mill reserves are exceedingly

St. Louis—List price of heavy meltin steel scrap went up \$3.25 here this wee while going prices of cupola cast, ran dom length rails and angles also ad vanced. No. 1 and No. 2 heavy meltin vanied. No. 1 and 100 to \$36.50, delivered on Granite City, Ill., basis. On current transactions \$40 to \$42 is being pair for No. 1 cupola cast, up \$5 from the former \$35-\$37; \$39 to \$42 for randor length rails, compared to the former \$37-\$40; \$38 to \$40 for angles and splic bars, instead of the former \$37-\$38.

Los Angeles—Danger of inflationary developments in the scrap market her and curtailment of steel mill operation is minimized by ship-breaking program and offshore supplies. National Meta & Steel Corp. is scrapping 60 vessels a Terminal Island, Los Angeles harbon and other similar operations either have begun or are contemplated.

Pig Iron . . .

Pig Iron Prices, Page 144

New York—An advance of \$3 a ton on all grades at Bethlehem, Pa., effective on all grades at Bethlehem, Pa., effective Mar. 11, has resulted in a corresponding increase in the delivered prices in Newark, N. J., and Brooklyn, N. Y. Thus, delivered prices in Newark are now \$36.34 for No. 2 foundry, \$35.84 for basic, \$37.34 for bessemer and \$36.84 for malleable; Brooklyn, \$37.50 for No. 2 foundry and \$38.00 on malleable. Southern foundry iron delivered Newark is \$35.68

Southern foundry iron delivered Newark is \$35.96.

The Bethlehem, Pa., producer also has advanced prices \$3 a ton across the board on iron out of Steelton, Pa., affecting basic, No. 2 foundry, malleable and bessemer and, in this case, low phosphorus as well. Base prices at Bethlehem and Steelton are now \$34 for basic, \$34.50 for No. 2 foundry, \$35.00 for malleable and \$35.50 for bessemer, and, the case of low phos at Steelton, \$39.00. Prices are subject to the company's applicable differentials, with all terms, general conditions of sale basic pricing policies remaining unchanged. maining unchanged.

maining unchanged.

Philadelphia — As a result of the recent \$3 advance on all grades of iron produced at Bethlehem, Pa., the base point on shipments to Philadelphia has shifted for the second time in two weeks, this time to Birdsboro, Pa. The Birdsboro producer advanced prices \$3 a ton several weeks ago to levels recently met by Bethlehem. Consequently, with the Birdsboro freight rate at \$1.52 compared with \$1.72 from Bethlehem, the Birdsboro base now governs. The Philadelphia delivered price is now \$36.02 on No. 2 foundry, \$35.52 on basic, \$37.02 on bessemer, and \$36.52 on malleable. A leading southern producer is now quoting No. 2 foundry at \$35.13, delivered Philadelphia.

Pittsburgh — United States Steel Corp.

Pittsburgh — United States Steel Corp. raised pig iron prices \$3 per gross ton across the board at Pittsburgh, effective Mar. 12; at Chicago and Cleveland, \$2.50 or basic and foundry, \$3 for bessemer and malleable; at Geneva, \$3 for basic and foundry. Pittsburgh Metallurgical Co. Inc. is no longer producing electric urnace ferrosilicon, although the company will continue to accept orders as ong as stock lasts.

Foundry operations recorded substan-ial improvement last week, reflecting seneral increase in industrial gas supply.

Boston — Removal of priorities will have but slight effect on pig iron distrilave but slight effect on pig iron distrintion. Most consumers getting iron on
atings would ordinarily get some tonage in any event and will continue to
to so. Without priorities, probably
everal hundred tons every month may
e available for redistribution. Major
roblem as to prices and supply looms
t the close of second quarter when
nd of the \$12 premium program for
he district furnaces is due. Currently
he district furnace is supplying practially all foundy iron consumed, with Bufalo and outside furnaces shipping little
to New England.

Buffalo—Across-the-board price in-

Buffalo -Across-the-board price reases of \$2.50 a ton on pig iron had o effect on brisk demand. Foundries ontinued to complain about insufficient hipments. In fact, the supply situation ppeared even tighter as one of the p mill producers reported increased use f hot iron to maintain open hearth

Chicago-All iron producers in this

Your driven power is just as efficient

as your COUPLINGS

LOVEJOY L-R

Flexible Couplings

PRACTICALLY MAINTENANCE-FREE.

Lovejoy Couplings are giving dependable, enduring service in every field of industry. Types and sizes for every duty from 1/6 to 2500 h.p.

Send for Complete Catalog with Free Selector Charts

Tedious fiaurina eliminated, Couplinas for your exact needs found in a jiffy, with all data right at hand. Wire



Pat & Pats, Pend.

Observe the simplicity exemplified in cutaway view of Lovejoy L-R Type "HQ", for heavy duties. Resilient load cushions of material best suited to particular service, suspended between rugged metal jaws. Free to adjust instantly to every emergency: misalignment, shock, vibration, backlash, endwise displacement, etc. Cushions always in sight. No teardowns for changing. Non-lubricated.

LOVEJOY FLEXIBLE COUPLING CO.

5071 W. LAKE ST.

CHICAGO 44. ILL.

Also Mfr. of Lovejoy-IDEAL Variable Speed Transmissions.



Use Handy Clean MARKAL PAINTSTIKS

for every type of identification marking. Specific types for various purposes. Can be applied under blinding heat or under coldest conditions with equal ease.
Marks are FADE-PROOF, WEATHER-CONTRACTOR OFFICE ASSESSMENT PROOF and PERMANENTLY LEGIBLE. No messy paint bucket, brush. 631 N. Western Ave. Chicago 12, III. Originotors of Paint Sticks



district are now on the higher price basis. Last to announce the price revisions were Inland Steel Co. and Hickman, Williams & Co. Advance of \$3 in Southern No. 2 foundry brings this prod-uct to \$34.12, delivered Chicago. With the end of pig iron allocations, foundries feel certain they will get more generous supplies, a view not shared by sellers.

Cincinnati - Pig iron shipments are fairly steady although expansion in volume has not been noted thus far. Melters who were not on the priority lists are besieging furnace interests in hope of getting more tonnage under the new allotment set-up.

Jackson, O.-Globe Iron Co., this city. has advanced high silicon silvery iron \$2.50 a gross ton, effective as of Mar. 10. Base price for 6 to 6.5 per cent grade is \$40.50, fob Jackson, O.

Rails, Cars . . .

Track Material Prices, Page 143

York -- Domestic freight New orders showed another sharp rise in February, to 13,727 compared with 9905 in January and an average of 5764 per month in 1946, according to the American Railway Car Institute, this city. At the same time, continued shortage of materials cut deliveries to 2293 cars in February from 2982 in January and an average during 1946 of 3496 per month. Backlog of unfilled orders stood at 86,-029 on Mar. 1 compared with 40,918 a year ago.

	v1947	°1946	1945	1944
lan	9.905	1,500	7,200	1,020
Feb	13,727	2,403	1,750	13,240
March		4,512	2,500	6,510
April	5	3,764	1,120	4,519
May		3,025	1,526	1,952
June	,	3,335	670	1,150
July		14,836	3,500	795
Aug		9,629	7,240	3,900
Sept		12,768	12,840	400
Oct		3,407	1,320	2,425
Nov		6,707	1,650	1,065
Dec		3,041	4,116	16,245
Total		68,927	45,432	53,221

* American Railway Car Institute.

Following the recent upsurge in car buying, orders have been rather light, with the Illinois Central list of 1000 hopper cars outstanding. This business was divided between the American Car was divided between the American Car & Foundry Co., this city, and the General American Transportation Corp., Chicago. Locomotive buying includes 28 Diesel-electric engines for the Canadian National Railways and 10 passenger locomotives for the Chesapeake

Philadelphia - Frog and switch material has been advanced about 5 per cent, with one eastern producer making the increases effective as of Mar. 10.

While Bethlehm Steel Co. has received approval from CPA for a \$1,477,400 exapproval from CPA for a \$1,411,400 expansion to its car shops at Johnstown, Pa., plans for going ahead with the project are indefinite. Baldwin Locomotive Works, which recently reduced operations to about 10 per cent of capacity, due to shortage of materials and components, is now up to about 25 per cent of expansion. cent of capacity.

Semifinished Steel

Semifinished Prices, Page 142

Pittsburgh—A scrap dealer is offering 3000 tons of billets monthly on the basis of \$82 a net ton, fob Pittsburgh.

Refractories . .

Refractories Prices, Page 144

Pittsburgh - Output is well sustaine at practical capacity, although some producers are seeking additional storag areas due to freight car shortage. Exceptional heavy demand makes it in possible to make much headway again order backlogs, which range from six t eight months on special shapes, such a silica coke oven brick. However, son standard items are available within tw months. Extensive relining program for much overworked blast furnace open hearths and coke ovens are expec ed to substantially augment overall demand for months ahead. Coke oven ex pansion programs now under consideration also are likely to require a sizab additional tonnage later this year. Som of these programs, however, have been delayed 3 to 4 months due to material to the state of the s shortages, which in effect has postpone previously scheduled refractory brid requirements.

Reflecting increased production cost producers raised magnesite brick price earlier this year \$2 per net ton to \$2. Basic brick prices were advanced \$5 follows: Chrome and chemical to \$5. each; magnesite to \$81; and chemic bonded magnesite to \$70 per net to Other refractory brick prices have he unchanged since advance allowed und OPA last August, and no action is ind cated until termination of present was

contract negotiations.

Iron Ore . . .

Baltimore - A steadily increasing vo ume of foreign iron ore will be receive at the Sparrows Point plant of Bethle hem Steel Co. as the result of completion of four of its 25,000-ton ore carrie and two other similar vessels to be place in operation this summer, leaving two other sister ships to be completed ne year. With these eight carriers, the Venezuela concession alone is expecte to supply 2 million tons of ore to Spa rows Point each year. Work at this corcession was delayed during the war, by is now in full development. The company is reported to have also acquired a flee of eight 10,900-ton general cargo ve sels which will be used in the intercoas al delivery of its finished products, it cluding the West Coast.

Tungsten Ore . . .

Tungsten Ore Prices, Page 144

New York-With little coming out China at this time, tungsten ore pricare strong, with wolframite per sho ton unit, now holding at \$24.00 \$25.00, duty paid.

According to London cables, quot

tions for European tungsten ore in Enland have advanced 50 cents a unit f \$17.65 to \$18.66. The British Minist of Supply recently advanced the sellir price for standard grade tungsten \$3.0

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 143

Cleveland - Several fastener man facturers here note a slight easing in the steel procurement difficulties. Supply of 1/2-inch screw stock and 7/8-inch and smaller hex stock continues very limited. Deliveries from warehouses, although slow, are reported as fairly steady. Mill shipments were delayed last month by a gas shortage, but milder weather will permit capacity operation, to the extent steel is available. The wire shortage is attributed by some to increasing demands for barbed wire fencing. One producer of lock nuts reports large scale buying of his product for use in applications not requiring lock nuts, because of availability in some quantity of a variety of sizes. This same interest has received an inquiry for more than 4 million nonstandard size nuts. Delivery date was quoted as 52 weeks.

Canada . . .

Toronto, Ont. — Notwithstanding skyrocketing prices for pig iron and scrap that have been the dominating feature of the United States markets recently, no reflection has been noted in the Canadian markets. Canadian prices continue under strict control and prevailing ceilings on scrap materials, in some instances, are less than half those quoted across the line, while the spread in iron and steel prices ranges up to as much as \$10 per ton, when duty and freight are taken into consideration. So far there has been no intimation of lifting of Canadian ceiling prices on iron and steel materials, although it is expected in some quarters that price revisions are not far off.

Canadians importing steel from the United States are faced with considerably higher costs than are those that depend on domestic steel supply. While some of the extra cost has to be absorbed by the purchaser, in other cases permission has been granted by Warnime Prices and Trade Board for intreased prices for finished materials to ass the additional costs along to the litimate consumer. The high prices cross the line, however, tend to throw more business into domestic channels, alhough under existing conditions Canadian steelmakers are not anxious to take a large additional tonnages. Steel mills this country are operating almost to apacity of their available steel supply and find considerable difficulty in meeting demands of old customers.

While Canadian steelmakers have opned books for second and third quarter, arphus capacity is available on only a witems to the end of June, and on ome materials the carryover of orders to third quarter will absorb a large art of production for that period. Mills ontinue to maintain quota shipments of eel to customers, but it is expected that here will be some step-up in allowable ornages over the next three months with the greater progress in this direction uring third quarter, providing there are a unforeseen developments to retard oduction schedules. Producers refuse commit themselves regarding prices a contract materials, thus they adhere gidly to the policy of making prices alown at time of shipment. Forward slivery contracts offer no protection gainst any future price increase.

Shortage of freight cars, together with ocked roads due to record breaking owfalls throughout Ontario and Quee, brought movement of iron, steel d scrap almost to a standstill for seval days, and transportation conditions ly now are getting back to normal.

Steel Scrap Market Boils As Buyers Press Demands

(Concluded from Page 69)

of the agencies concerned and they have assured him that, in the aggregate, over 500,000 tons of scrap should be put into industrial channels by government agencies during the next two months.

The War Assets Administration has directed all zone administrators and regional directors to locate and offer for sale whatever iron and steel scrap is available in their inventories. Much material now in WAA inventory, such as obsolete machine tools, general industrial equipment in poor condition and residual steel inventories, has no commercial value except scrap. The War Assets Administration will expedite disposal of property of this character. It is hoped that about 300,000 tons of scrap will be made available to industry by WAA within the next two months.

In addition, the Navy during March and April will make available about 50,000 tons of scrap and the Army will provide about the same amount. The Army will also offer 150,000 tons of battlefield scrap collected in Europe for return to the United States within the next few months.

The Navy, Army and Maritime Com-

mission are exploring the possibility of returning, through commercial channels, greatly increased quantities of scrap now located in the European and Pacific

Exclusive of such quantities as may be returned from overseas, it is estimated that about 1,250,000 tons of scrap should be made available by the government during the balance of 1947.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2000 tons, die casting plant, Hillside, Ill., for Aluminum Co. of America, to Midland Structural Steel Co., Gicero, Ill., for fabrication by Allied Structural Steel Co., Chicago; John Griffiths & Sons Construction Co., Chicago, contractor; bids Feb. 20.

700 tons, plant addition, American Brake Shoe Co., Niagara Falls, N. Y., to American Bridge Co., Pittsburgh.

500 tons, rolling mill, Scovill Mfg. Co., Waterbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa., through Stone & Webster Engineering Co., Boston.

500 tons, first unit, Baeries Inc., Cambridge, Mass., to American Bridge Co., Pittsburgh.

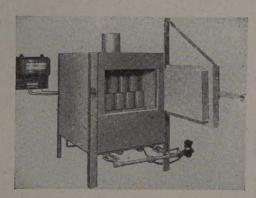
300 tons, building, Columbia Cable Co., Trenton, N. J., to American Brdige Co., Pittsburgh.

240 tons, building, Sioux City, Iowa, for Metz Baking Co., to Clinton Bridge Works, Clinton, Iowa, for fabrication by Allied Structural Steel Co., Chicago; W. A. Klinger Co., Sioux City, Iowa, contractor.

175 tons, two Washington state highway bridges, to Pacific Car & Foundry Co., Seattle.

175 tons, Bureau of Roads, Mendenhall bridge,

SAUNDERS GAS FIRED OVENS



SAUNDERS NO. 3W OVEN

Heavily insulated, angle iron frame gas fired BUZZER Atmospheric burner

Inside working dimensions 18" x 18" x 12" high

Overall dimensions 30^{11} wide x 38^{11} deep x 56^{11} high

With Brown Single point indicating pyrometer controller and stand, crated, FOB, New York \$507.50

With Indicating Pyrometer and stand, crated, FOB, New York \$345.

WAX ELIMINATION TOOL HARDENING

Temperatures to 1800°F without blower

Three sizes available

Developed to meet the needs of the precision casting industry, these ovens can be used for any work requiring open flame annealing temperatures up to 1800°F.

These ovens are an important piece of equipment for precision investment casting. For related equipment write

ALEXANDER SAUNDERS & CO.

Successor to J. Goebel & Co. -Est. 1865
PRECISION CASTING EQUIPMENT AND SUPPLIES
95 Bedford Street New York City 14

arch 17, 1947

Alaska, to Poole & McGonigle, Portland, Oreg.

160 tons, three buildings, Villanova College, Philadelphia, to American Bridge Co., Pittsburgh.

150 tons, building B-6, Moline, Ill., for John Deere Spreader Works, to Gage Structural Steel Co., Chicago, for fabrication by Allied Structural Steel Co., Chicago.

135 tons, building, Denver, for Firestone Tire & Rubber Co., to Midwest Steel & Iron Works Co., Denver.

135 tons, factory building, American Cyanamid Co., Wallingford, Conn., to American Bridge Co., Pittsburgh; Frank P. Sullivan Inc., New Haven, general contractor; Fox Steel Co., New Haven, awarded 50 tons reinforcing bars.

112 tons, bridge, Richmond, Vt., to Vermont Structural Steel Co., Burlington, Vt.

107 tons, bridge, Lackawanna county, Pennsylvania, to Pine Brook Iron Works, Scranton, Pa.

100 tons, bridge, York county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4300 tons, punched angles for prefabricated housing, William H. Harmon Corp., Wilmington, Del., bids asked.

3500 tons, transmission towers, Indiana & Michigan Electric Co.

2500 tons, transmission towers, Toledo Edison Co.

700 tons, addition to power plant, Ponca City, Okla., for Public Utility Engineering & Service Corp.

600 tons, addition to toll building, Wichita, Kans., Southwestern Bell Telephone Co.

575 tons, eight towers for Pasco and Umatilla stations; bids to Bonneville Power Administration, Portland, Oreg., Mar. 28; spec. 3940.

400 tons, transmission towers, Detroit Edison Co.

267 tons, state bridge, Clearfield county, Pennsylvania, bids Mar. 28.

260 tons, Lamont library building, Harvard University, Cambridge, Mass.; Phoenix Iron Co., Phoenixville, Pa., low; George A. Fuller Co., Boston, general contractor.

250 tons, office No. 11, Jamestown Metal Equipment Co., Jamestown, Pa., bids closed Mar. 12.

100 tons, addition, Chicago, Tropic-Aire Inc.; Ragnar Benson Inc., Chicago, engineer-contractor.

Unstated, radial gates, etc., Deschutes project, Oregon, spec. 1719; bids to Bend, Oreg., Apr. 7.

Unstated, 12 prefabricated buildings; bids to Bonneville Power Administration, Mar. 19; spec. 3941.

Unstated, two prefabricated steel buildings spec. 1724, Hungry Horse dam project; bids to Bureau of Reclamation, Denver, Apr. 16.

REINFORCING SHAPES . . .

REINFORCING BARS PLACED

1800 tons, veterans' hospital, Peekskill, N. Y., through Merritt-Chapman & Scott, with Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, power plant work, Philadelphia Electric Co., Philadelphia, to Truscon Steel Co., Youngstown, O., and 400 tons, power plant, Elmira, N. Y., through Gilbert Associates, Reading, Pa., to the same company.

900 tons, University of Washington medical buildings, to Northwest Steel Rolling Mills Inc., Seattle.

600 tons, Post-Intelligencer newspaper plant, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

3200 tons, sewage disposal work for Philadelphia, bids open Mar. 25. 800 tons, two buildings, Washington State College, Pullman, Wash.; general contracts Nettleton & Baldwin, Seattle, and Henri George, Spokane, Wash.

600 tons, Hippodrome building, St. Paul; bid Mar. 19.

500 tons, foundation work, Yale & Towne Coplant, Philadelphia.

Unstated tonnage, Blitz-Weinhard brewery plan extension, Portland, Oreg.; general contract to Reimers & Jolivette, Portland, Oreg.

PLATES . . .

PLATES PLACED

2000 tons, storage tanks, various locations, here Oil Co., to Graver Tank & Mfg. Co. Chicago.

PLATES PENDING

850 tons, storage tanks, Chicago, for Wester Oil & Supply Co.

Unstated, storage tanks, Blitz-Weinhard brewer Pertland, Oreg.; general contract to Reime & Jolivette, Portland, Oreg.

PIPE . . .

CAST IRON PIPE PLACED

1900 tons, various sizes for Yakima, Wash., t H. G. Purcell, Seattle, for U. S. Pipe Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

1100 tons, Seattle improvements; bids in. 125 tons, 6-inch, Providence, R. I.

105 tons, 8 and 10-inch, Milton, Mass.

100 tons, Kent, Wash.; bids in.

100 tons, Pullman, Wash.; bids in.

100 tons, 6 to 10-inch, Fall River, Mass.

STEEL PIPE PENDING

30,000 feet, 6-inch steel pipe or invasion pip Haverhill, Mass.

Unstated, 130,000 feet, 1½ to 12-inch, wrappe and dipped steel pipe, for Hazel Dell distric Vancouver, Wash; Thorburn & Lopez, Sea tle, low \$221,397.

Unstated, 6500 feet, 30-inch coated steel pip bids opened by Salem, Oreg., Mar. 7.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National Railways, 28 diesel-electrolocomotives, with 18 going to Electro Motiv Div. of General Motors Corp., La Grang Ill., and 10 to American Locomotive Connew York.

Chesapeake & Ohio Railway, 10 passeng locomotives, five 4-8-4 type to Lima Loc motive Works Inc., Lima, O., five 4-6-4 typ to Baldwin Locomotive Works, Eddyston Pa.; cost, approximately \$3,560,000.

RAILROAD CARS PLACED

Cudahy Packing Co., 200 refrigerator cars own shops.

Illinois Central, 1000 hopper cars, divide equally between American Car & Found Co., New York, and General American Tran portation Co., Chicago.

Mill Power & Supply Co., Charlotte, N. C., I trolley coaches, to Pullman Standard C Mfg. Co., Chicago.

Seaboard Air Line, 300 seventy-ton hopper can to Pullman Standard Car Mfg. Co., Chicag

Southern Pacific, 500 fifty-ton auto cars, Pressed Steel Car Co., Pittsburgh; these as in addition to the 5100 freight cars previous noted as placed.

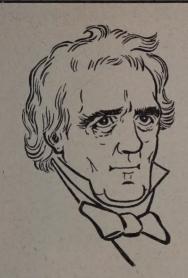
RAILROAD CARS PENDING

Southern Pacific, 3000 fifty-ton steel-sheather box cars and 1000 fifty-ton steel hopper can bids Mar. 20.

RAILS PLACED

Chesapeake & Ohio, 1785 tons rail, to Bethle hem Steel Co., Bethlehem, Pa.





James Buchanan, 15th President of the U.S. was in office when the A. W. Cadman Mfg. Co. was established. Thus for 87 years Cadman has supplied fine bearing materials to railroads, power plants, steel mills, industrial plants and manufacturers. So if there is anything you want to know about bearing metals, just ask us.

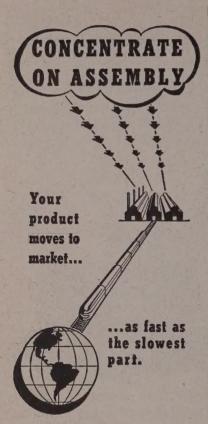
THE A. W. CADMAN MFG. CO., PITTSBURGH, PA.





6521 W BURNHAM ST., MILWAUKEE 14, WIS., U. S. A.

A 5065-1/2R



Accelerating assembly lines with accurate parts in large quantities is our specialty.

Time saving methods and devices we have recently invented enable us to make parts better and faster for less!

The more space you devote to assembly the more products you market. Plan on U.S. to start your assembly lines sooner.

U-S-AUTOMATIC

Screw Machine Products

AMHERST • OHIO



CONSTRUCTION AND ENTERPRISE

CALIFORNIA

HUNTINGTON BEACH, CALIF.—Sportsman Industries Inc., Roy T. Brown president, will build a new factory on Ocean Ave. for manufacture of outboard motors and bicycles.

LOS ANGELES—K. H. Davis Wire & Cable Corp., 2417 E. 23rd St., will build a \$210,000 plant at 2260 S. Santa Fe Ave.

LOS ANGELES—Pacific Screw Products Corp. has been formed with a capital of \$3 million to manufacture mechanical appliances, screws, fittings, nuts and bolts. Principal is Stephen A. Compas, Arcadia, Calif.

OAKLAND, CALIF.—Bay City Iron Works Inc. has been formed with 7500 shares of no par value capital stock. W. H. Hamison, Oakland, is principal of the firm.

POMONA, CALLF—Fairbanks, Morse & Co. will build a shipping and assembly building at Palomares and Commercial streets. To cost \$84,530, the structure will be 40 x 240 ft in area.

ILLINOIS

CHICAGO—Accurate Spring Mfg. Co., 3811 W. Lake St., has suffered damage estimated at \$200,000 from fire at its plant.

INDIANA

HAMMOND, IND.—Calumet Machine Corp., 5469 Calumet Ave., has been formed by Walter A. Ryband with a capital of \$50,000 as a foundry and machinery firm.

MISSOURI

MALDEN, MO.—City plans to build a municipal power plant building, oil storage tanks and atmospheric cooling tower estimated to cost about \$71,000. Consulting engineers are Russell & Axon, 6635 Delmar Blvd., St. Louis.

RICHLAND, MO.—City has plans completed for a power plant, diesel engine unit, electric distribution system and street lighting system, all to cost about \$89,000.

an to cost about \$55,000.

ST. LOUIS—Hyde Park Breweries Association, 3607 N. Florissant Ave., has awarded a contract to Fruin-Colnon Contracting Co., 1706 Olive St., for an addition to its bottling plant which will cost \$121,500.

ST. LOUIS—St. Louis Independent Packing Co., 3815 Chouteau Ave., will receive bids April 1 for construction of a 3-story addition to existing packing plant. Improvement will cost about \$230,000.

ST. LOUIS—U. S. Steel Supply Co, has awarded a \$55,000 contract to Fruin-Colnon Contracting Co., 1706 Olive St., for alterations to a factory building at 311 S. Sarah St. Architect is William Levy, Railway Exchange Bldg.

ST. LOUIS—Mallinckrodt Chemical Works, 3600 N, Second St., has awarded a \$70,000 contract to Dickie Construction Co., Loudermann Bldg., 317 N. 11th St., for alterations to its plant at 200 Salisbury St. Consulting engineer is John R. Nichols, 285 Columbus St., Boston.

MONTANA

BILLINGS, MONT.—Carter Oil Co., Tulsa, Okla., R. B. Curran, vice-president, has awarded contract to Fluor Corp. Ltd., Los Angeles, for construction of oil refinery here to cost \$8 million. Designer of plant is Universal Oil Products Co., 310 S. Michigan Ave., Chicago.

NORTH CAROLINA

CHARLOTTE, N. C.—Auto Spring Co. Inc. has been formed by G. W. Burgess with a capital of \$100,000.

CHARLOTTE, N. C.—Carolina Watch Repair

Co. has been formed by Victor Miller with a capital of \$100,000.

CHARLOTTE, N. C .- Parks-Cramer Co. will

remodel its shipping department building and construct a new building at a cost of \$58,000.

OHIO

BROOKPARK, O.—E. W. Ferry Screw Products Inc., 8219 Almira Ave., Cleveland, will move here when its proposed \$160,000 plant is built

CLEVELAND—Perfection Stove Co. will build a press building costing \$2,400,000 adjacent to its plant at 1135 Ivanhoe Rd.

CLEVELAND—Cleveland Electric Illuminating. Co, will spend \$245,850 to prepare a building at 205 W. St. Clair Ave. for engineering and administration offices.

CLEVELAND—Industrial Rayon Corp. will spend \$89,000 on a Quouset building to be erected at its plant at 9801 Walford Ave.

CLEVELAND—Eaton Mfg. Co., 739 E. 140th St., has made an appropriation of \$2,366,233 for the modernization and improvement of all its plants.

GALION, O.—Galion Iron Works & Mfg. Co., South St., will build a \$60,000 addition to its plant.

NILES, O.—Ohio Galvanizing Co. suffered damage estimated at \$200,000 from fire.

ORRVILLE, O.—Orrville Specialty Co., Westwood Ave., will construct a \$50,000 building.

YOUNGSTOWN—Electro Strip Plating Corp.
has been formed with a capital of \$300,000
to manufacture steel plating. Incorporator is
Joseph Wilkoff, 334 Tod Lane.

ORECON

FORTLAND, OREG.—Pacific Power & Light Co. has awarded a \$90,000 contract to L. H. Hoffman Co. for construction of a three-wing addition.

PENNSYLVANIA

MIDLAND, Pa.—Crucible Steel Co. of America has let contracts totaling \$21 million for its expansion program. United Engineering & Construction Co., General Electric Co., Westinghouse Electric & Mfg. Co., American Bridge Co., Detroit Steel Products Co. and Cleveland Crane & Engineering Co. are among the firms awarded contracts.

SOUTH CAROLINA

CHARLESTON, S. C.—West Virginia Pulp & Paper Co. will install a \$5 million kraft paper machine at its plant here.

TEXAS

HOUSTON, TEX. — Pittsburgh Plate Glass Co. will spend \$500,000 on improvements at its Liberty Rd. plant.

HOUSTON, TEX.—Western Electric Corp. will begin construction of a manufacturing and repair plant to cost over \$1 million.

HOUSTON, TEX.—General Truck Co. has acquired a 5-acre site at 4200 Harrisburg for proposed \$150,000 plant and warehouse.

VIRGINIA

BEDFORD, VA.—Virginia Rubatex Division of Great American Industries plans 2-story addition costing \$100,000. Firm will also install \$100,000 worth of equipment.

WASHINGTON

PUYALLUP, WASH. — Wells-Bonnell Sheet Metal Co. suffered damage estimated at \$50,000 from a fire at its main plant.

SEATTLE—Western Containers, 4610 E. Marginal Way has awarded a contract to Austin Co., Cleveland, for a 75 x 180 ft warehouse addition.

TACOMA, WASH.—Washington Gas & Electric Co. plans installation of two fuel storage and two butane gas storage tanks at 2120 River St.